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Nebraska
High-School Manual
1912

COMPILED JOINTLY BY
THE UNIVERSITY OF NEBRASKA
AND THE
STATE DEPARTMENT OF EDUCATION

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Monograph

NEBRASKA

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TO THE AUTHORITIES OF THE NEBRASKA PUBLIC SCHOOLS

The University of Nebraska and the State Department of Education join in presenting, with their cordial greetings, this statement in regard to their relations with the public high schools of the state.

This manual assumes that the high school exists for the purpose of aiding the youth to attain the truest citizenship and the highest success in life. It is believed that a high-school curriculum devised and carried through with these ends in view is also a more desirable foundation for a college education in case pupils are able to press on and secure this larger privilege. The manual aims to provide courses of study in the respective secondary branches so as to make each serve its highest possible educational end. It also offers programs of study for schools of different grades, so planned as to include the foundation subjects of instruction, arranged in proper sequence to secure a degree of uniformity and with due regard to Nebraska conditions. It permits the selection of curricula that will serve immediate ends, at the same time affording a reasonable articulation between the secondary schools and the higher institutions.

In order to increase the practical helpfulness of this manual, a committee was appointed for each subject appearing in the former manual, consisting of a member of the faculty of the University of Nebraska from the department most closely related to the subject, and at least two other members having intimate knowledge of the subjects from the standpoint of the secondary schools. These committees were appointed by the State Superintendent of Public Instruction, the President of the Superintendents and Principals' Association, and the Inspector of Accredited Schools. The committees were as follows:

Agriculture—Superintendent F. M. Hunter, Lincoln; Superintendent C. W. McMichael, Holdrege; Professor W. T. Stockdale, Chadron.

American History—Professor C. E. Persinger, University; Superintendent J. R. Fulk, Seward; Superintendent C. A. Mohrman, Neligh.

Astronomy—Professor G. D. Swezey, University; Superintendent C. N. Walton, Wahoo; Superintendent C. S. Jones, Ord.

Botany—Dean C. E. Bessey, University; Miss Emma Hanlon, Hastings; Superintendent Robert Thomson, Orchard.

Chemistry—Professor Benton Dales, University; Professor H. A. Senter, Omaha; Principal W. B. Johns, York.

Civics—Professor G. E. Howard, University; Mrs. Ada I. Atkinson, Omaha; Superintendent R. W. Eaton, Geneva.

English—Dean L. A. Sherman, University; Professor P. H. Frye, University; Miss Mary Sullivan, Omaha; Miss Louise Miller, Lincoln.

- European History—Professor F. M. Fling, University; Professor C. N. Anderson, Kearney; Miss Marie Upson, Beatrice.
- French—Professor Clara Conklin, University; Miss Abba W. Bowen, Omaha; Mlle. Andree, Brownell Hall.
- Geology—Professor E. H. Barbour, University; Superintendent C. M. Barr, Hastings; Professor H. B. Duncanson, Peru.
- German—Professor Laurence Fossler, University; Miss Abba W. Bowen, Omaha; Miss Alma Hosic, Kearney.
- Greek—Professor J. T. Lees, University; Miss Bessie Snyder, Omaha; Professor J. S. Brown, Crete.
- Latin—Professor G. E. Barber, University; Miss Olivia Pound, Lincoln; Miss Kathleen G. Hearn, Aurora.
- Mathematics—Dean E. W. Davis, University; Superintendent W. L. Stephens, Lincoln; Principal A. R. Congdon, Fremont.
- Methods—Dean Charles Fordyce, University; Mrs. S. O. Anderson, Lincoln; Superintendent A. L. Caviness, Fairbury.
- Physics—Professor Herbert Brownell, University; Professor C. W. Philpott, Chadron; Superintendent George E. Lee, Culbertson.
- Physical Geography—Professor G. E. Condra, University; Professor E. E. Lackey, Wayne; Miss Eva O'Sullivan, Omaha.
- Physiology—Dean R. H. Wolcott, University; Professor H. O. Sutton, Kearney; Superintendent W. H. Morton, Ashland.
- Political Economy—Professor G. E. LeRossignol, University; Superintendent E. Clippinger, Sutton; Superintendent N. M. Graham, South Omaha.
- Zoology—Dean R. H. Wolcott, University; Miss Caroline E. Stringer, Omaha; Mrs. C. Phillips, Lincoln.
- Reference Library—Professor W. K. Jewett, University; Superintendent R. J. Barr, Grand Island; Miss Charlotte Templeton, Lincoln.

In view of the change of policy by which the University grants credit for any subject taught in an approved manner, committees have been appointed to prepare courses of study in such other subjects not previously recognized as may properly be considered worthy of presentation in the program of studies for secondary schools in Nebraska. These reports will be published at an early date.

To all who assisted in preparing material for this manual, thanks are offered. It is the sincere desire of all concerned to increase its value. Criticisms and suggestions will be appreciated.

Very truly yours,

S. AVERY,

Chancellor of the University of Nebraska.

J. E. DELZELL,

Superintendent of Public Instruction.

A. A. REED,

Inspector of Accredited Schools.

PROGRAMS OF STUDY FOR HIGH SCHOOLS

The programs published in the former manual have been slightly modified in accordance with suggestions made by the members of the School of Superintendence held jointly by the University and the State Department of Education. They were prepared originally after a careful study of existing programs, and are the outcome of a natural evolution. They afford an articulation which renders it easy for pupils to be transferred from one district to another of higher grade, in accordance with the free high-school law. They provide practical uniformity in the first two years, and designate the place in the program that elective subjects shall occupy in the last years. They include the subjects required for entrance to normal school, college and university, and yet they afford enough elasticity to serve the ends of those not recognizing such claims. They offer a well-balanced group of courses that form the foundation of a liberal education. Foundation studies should be such as to inspire the individual to go farther and to assist him should he wish to go on. Generally, the subjects that best fit the individual for life are the ones that best prepare him for the next step in his education. Any subject is practical that stimulates the individual to a broader life and a more sympathetic touch with human interests.

Each superintendent or principal in charge of a high school should study carefully its needs and resources, and should guide the school board in selecting such groups of courses as local conditions will warrant. The smaller schools should have a single curriculum. This should be followed by all pupils. It is better to permit a pupil to drop a subject when it has become evident that it cannot be carried to advantage, rather than to scatter the energies of the teaching force over too wide a range of courses. The larger school should arrange for such extra groups as may be within their needs and resources. By following the order of the official Program of Studies, sufficient uniformity will result to serve all important ends. School authorities may safely work toward this program, without fear of radical changes in the future.

ONE-YEAR PROGRAM

For Schools Having Three Teachers for Nine Grades

First Semester		Second Semester	
	Periods.		Periods.
Algebra	5	Algebra	5
English and Book-keeping	5	English	5
Physical Geography...	5	Agriculture	5
Latin	5	Latin	5

A school may substitute for Latin, civics in the first semester and inventional geometry in the second semester, or such other secondary work as local conditions may warrant.

English includes composition, rhetoric, and literature.

TWO-YEAR PROGRAM**For Schools Having Four or More Teachers****Grade IX**

As above.

Grade X

First Semester		Second Semester	
	Periods.		Periods.
Plane Geometry	5	Plane Geometry	5
Ancient History	5	Ancient History	5
Botany..2 English..3	5	Botany..3 English..2	5
Caesar and Latin Com- position	5	Caesar and Latin Com- position	5

A school may begin Latin in grade ten.

THREE-YEAR PROGRAM**For Schools Having at Least Two High-School Teachers****Grade IX**

As above

Grade X

As above

Grade XI

First Semester		Second Semester	
	Periods.		Periods.
Algebra	5	Solid Geometry	5
Cicero and Latin Com- position	5	Cicero and Latin Com- position	5
German	5	German	5
Physics	5	Physics	5
American History and Civics	5	American History and Civics	5
English	5	English	5

School authorities will select four subjects.

A school may begin Latin in grade ten.

FOUR-YEAR PROGRAM**For Schools Having at Least Three High-School Teachers****Grade IX**

As above

Grade X

As above

Grade XI

First Semester		Second Semester	
	Periods.		Periods.
Algebra	5	Solid Geometry	5
Cicero and Latin Compo- sition	5	Cicero and Latin Compo- sition	5
German	5	German	5
Physics	5	Physics	5
Medieval History	5	Modern History	5
English	5	English	5
Review Arithmetic and Geography	5	Elective	5

School authorities will select four subjects.

Grade XII

First Semester		Second Semester	
	Periods.		Periods.
Vergil	5	Vergil	5
German	5	German	5
Chemistry..2		Chemistry..3	
English..3	5	English..2	5
American History and		American History and	
Civics	5	Civics	5
Review Grammar and		Pedagogy	5
Reading	5	Elective	5
Elective	5		

School authorities will select four subjects.

A school may begin Latin in grade ten.

Bookkeeping, grouped with ninth grade English in the program of studies, contemplates a course of six weeks following the outline of the State Department of Education in the definition of the requirements for examination for a teacher's certificate. When so presented, it may be included with English for credit. It meets the requirement for bookkeeping in the normal training course, and the grade will be accepted for a certificate. The outline is as follows: 1. Definitions. 2. Business forms—bills, notes, checks and drafts, accounts. 3. Elementary laws of negotiability. 4. The simple principles of debits and credits. 5. Business correspondence and letter writing.

BREADTH AND SYMMETRY

The University of Nebraska and the State Department of Education urge the importance of maintaining breadth and symmetry as well as thoroughness in the high-school curricula. In each year there should be a due proportion of English, history, language, mathematics, and science.

SPECIAL GROUPS

Classical Training—Attention is called to the importance of classical training. School authorities should be careful not to misunderstand or misapply the arguments sometimes put forward against the study of ancient tongues. Those urging these arguments usually mean only that duly organized and ably taught courses in modern language are of equal worth, year for year, with study in the classics. They do not mean to urge the neglect of Greek or Latin.

Scientific—The general program above is a satisfactory preparation for college courses in science. When desirable a modern language may be substituted for all or part of the Latin for entrance purposes.

REQUIREMENTS FOR ADMISSION TO THE UNIVERSITY

Admission to the University is gained only through registration in some one of its seven colleges or four schools. A uniform table of entrance requirements has been established which varies only in a small degree for all of the undergraduate colleges. The following table of entrance requirements becomes effective September 1st, 1912:

Required subjects—	Points
English	4
*History (European)	2
†Language (foreign)	6
‡Mathematics	4
§Science (laboratory)	2
Elective subjects—	
Other subjects taught in an approved manner in an accredited secondary school.....	12
Total	30

An entrance credit or "point" is given for the work of a class holding five recitations a week of forty to fifty minutes each for at least eighteen weeks. In laboratory courses a credit "point" is given for three recitations and two double periods of laboratory work, under the supervision of an instructor, each week for at least eighteen weeks. In laboratory courses without recitation the equivalent of fifteen single periods each week is required.

*History: It is recommended that Greek and Roman history be offered in meeting the European history requirement.

†Language: For entrance to the College of Arts and Sciences at least two years of Latin are recommended. Two years (four points) are required of students entering the six-year combined academic-medical course unless excluded by the committee on accredited schools.

‡Mathematics: For entrance to the College of Agriculture a third year (two points) in mathematics may be offered in place of the third year in foreign language. For entrance to the College of Engineering six points in mathematics are required. To meet this requirement a third year in mathematics may be substituted for the third year in foreign language.

§Science: It is recommended that physics be offered in meeting the science requirement.

ADMISSION TO THE VARIOUS COLLEGES

For admission to the freshman class in the College of Arts and Sciences, the College of Agriculture, and the College of Engineering, the candidate must present thirty credit points from an accredited secondary school of which he must be a graduate.

For admission to the freshman class of the College of Law the candidate must present one year of college work in addition to the above thirty points.

For admission to the freshman class of the six-year course in the College of Medicine the candidate must meet the regular requirements for the College of Arts and Sciences with four of the six points of foreign language in Latin. For admission to the freshman class of the four-year course the candidate must present two years of academic work in addition to the thirty points.

For admission to the freshman class of the two-year and three-year courses of the School of Pharmacy the candidate must present the equivalent of a two-year high-school course. For admission to the four-year course the candidate meets the regular entrance requirements to the College of Arts and Sciences and is registered in that college.

For admission to the School of Fine Arts the candidate must meet the entrance requirements of the College of Arts and Sciences.

Conditional admission is permitted to graduates of accredited schools on a minimum of twenty-eight "points." Graduates having less than twenty-eight "points" will be required to make up deficient "points" in an accredited school, for conditional admission.

CONDITIONS OF ACCREDITMENT

An accredited school must have in operation a course that permits the graduates for the current year to receive thirty credits. Schools with a three-year course of study may be admitted to the Junior Accredited list. Graduates from the Junior Accredited schools will receive conditional admission to the University of Nebraska upon the completion of enough work in an accredited school to make a total of twenty-eight points. The Junior Accredited school must meet the conditions of an accredited school in so far as equipment and facilities for instruction are concerned in the work of the three years offered.

Schools with four years of secondary work that are unable to meet in full the conditions for the four-year list may be placed upon the Junior list to receive a maximum of twenty-eight points.

The conditions on which a school is placed on the accredited list are as follows:

1. The program of studies should be well balanced in language, mathematics, science, rhetoric, literature, and history.

2. Sciences should be taught with adequate laboratory equipment, and with a course of study that provides for recitation periods and laboratory or field work. The proportion of time should be approximately three periods a week for recitation purposes and two double periods a week for laboratory and field work.

3. The library should be supplied with sufficient supplementary and reference books for the courses in literature, history and science.

4. The recitation periods should be standard (40 minutes), at least in the subjects required for admission to college.

5. The superintendent (or principal) should have time for supervising the work of the teachers.

6. The teaching force in number, scholarship and professional training should be up to the standard set by the experience of good schools. Instructors should have four years of training beyond a four-year high-school course, including special preparation in the subjects in which they are to give instruction, or its equivalent. In determining the qualifications the ratio of two years of successful experience as a high-school instructor may be accepted as equivalent to one year of higher training.

7. All schools are asked to make a detailed report in September, giving information necessary for bringing the condition of the schools before the committee. Schools that have been previously accredited and that have not made much change in the teaching force, may be placed upon the accredited list for the current year immediately. New applicants and schools that have made material changes in the teaching force will not be accredited until after a visit of inspection.

8. There must be at least two instructors in Junior Accredited schools giving their time to secondary school work. It is recommended that at least one of the instructors meet fully the standard of qualifications applying to fully accredited schools.

Should a school approximate this standard, the High-School Manual and a statistical blank for information will be sent. If the reply is satisfactory, an inspector will visit the school, and the committee on accredited schools will take such action as his report may justify.

SOME ADVANTAGES OF ACCREDITMENT

Admission without examination to the University of Nebraska and nearly every college in the United States.

Guidance in framing and steadying the program of studies and such groups as may be advisable.

Expert assistance in selecting apparatus, texts, and reference books.

Annual inspection of school and, when desired, a confidential report to the school board.

Public recognition of the excellence of the school by publication of the list each year in the University of Nebraska Calendar and in the University Journal.

ACCREDITED SCHOOLS

The University maintains a list of "accredited" secondary schools whose graduates are admitted to any college or school of the University (and to nearly all of the colleges or universities of the United States) without entrance examinations in those subjects whose completion within such schools is properly certified. Unless a graduate of an "accredited" school a candidate for admission must be prepared to take entrance examinations in those subjects in which he desires entrance credits. "Accredited" schools are such as are, under annual inspection by the University inspector of accredited schools, found to have a well-balanced program of studies, satisfactory laboratory equipment and library facilities, and a teaching force adequate in number and competent in scholarship and professional training to accomplish the work they are undertaking.

Four-Year Accredited Schools. The following four-year secondary schools were accredited to the University for the year 1911-12 to receive not to exceed 32 points of entrance credit, according to the work of the individual graduate:

Adams	Central City	Franklin
Ainsworth	Chadron	*Franklin
*Albion	Chester	Academy
Alliance	Clarks	*Fremont
Alma	Clay Center	*Friend
Ansley	*Columbus	Fullerton
Arapahoe	Cotner Academy	Gates Academy
Arlington	(Bethany)	(Neligh)
*Ashland	Cozad	*Geneva
Atkinson	Crawford	Genoa
*Auburn	Creighton	Gibbon
*Aurora	Creighton	Gordon
Bancroft	Academy	Gothenburg
Battle Creek	(Omaha)	*Grand Island
*Beatrice	*Crete	Grand Island
Beaver City	Culbertson	Academy
Beaver Crossing	Dana Academy	Greeley
Bellevue	(Blair)	Gretna
Academy	Davenport	Guide Rock
*Blair	*David City	Hartington
Bloomfield	Diller	Harvard
Bloomington	*Doane Academy	*Hastings
Blue Hill	(Crete)	*Hastings
Blue Springs	Dodge	Academy
Brady	Edgar	*Havelock
Bridgeport	Elgin	*Hebron
Broken Bow	Elmwood	*Holdrege
*Brownell Hall	Emerson	Hoope
(Omaha)	Exeter	Humboldt
Burwell	*Fairbury	Immaculate
Butte	Fairfield	Conception
Cambridge	Fairmont	Academy
Cedar Rapids	*Falls City	(Hastings)

Indianola	O'Neill	Sidney
*Kearney	Ord	Silver Creek
Kenesaw	Orleans	*South Omaha
Kimball County	Orleans	Spalding Acad-
Laurel	Seminary	emy
Lawrence	Osceola	Spencer
Lexington	Overton	Springfield
*Lincoln	Oxford	Stanton
Louisville	Papillion	Sterling
Loup City	*Pawnee City	Stromsburg
Luther Academy	Pender	*Superior
(Wahoo)	Pierce	Sutton
Lyons	Plainview	Syracuse
*McCook	*Plattsmouth	Table Rock
Madison	Ponca	*Teachers College
Merna	Randolph	High School,
Minden	Ravenna	The University
Mt. St. Mary's	Red Cloud	of Nebraska
Seminary	Sacred Heart	*Tecumseh
(Omaha)	Academy	Tekamah
*Nebraska City	(Omaha)	Tilden
*Nebraska Mili-	Sacred Heart	Trenton
tary Academy	High School	Ulysses
(Lincoln)	(Omaha)	*University Place
*Nebraska Wes-	St. Catherine	Valentine
leyan Academy	Academy	Valley
(University	(Jackson)	*Wahoo
Place)	St. Edward	Wakefield
Neligh	St. Mary's Acad-	Wayne
Nelson	emy (O'Neill)	Weeping Water
Newman Grove	St. Paul	Weeping Water
*Norfolk	St. Theresa's	Academy
North Bend	High School	West Point
*North Platte	(Lincoln)	Wilber
Oakdale	Sargent	Wisner
Oakland	*Schuyler	Wood River
Ogallala	Scottsbluff	Wymore
Ohiowa	*Seward	*York
*Omaha	Shelton	

* Accredited by the North Central Association of Colleges and Secondary Schools.

By approved action of the University Senate in June, 1911, the following was adopted:

1. After September 1, 1912, twenty-eight points shall be the minimum requirement for conditional admission to the Colleges of Arts and Sciences, Engineering, and Agriculture, in the University.

2. There shall be maintained a list of Junior Accredited Schools, on the basis of three years of secondary school work. The graduates of these schools may receive conditional admission to the University upon the completion of sufficient additional work in an accredited school to secure the minimum of twenty-eight points.

Junior Accredited Schools. The following secondary schools were accredited to the University for the year 1911-12 to receive from 22 to 28 points of entrance credit, according to the length of the course and the work of the individual graduate:

Bartley	Gering	Orchard
Beemer	Giltner	Osmond
Benkelman	Grafton	Pilger
Benson	Greenwood	Republican City
Bertrand	Hardy	Riverton
Brock	Herman	Rulo
Callaway	Hickman	Rushville
Campbell	Holbrook	Scribner
Cedar Bluffs	Howells	Shelby
Clarkson	Humphrey	Shickley
College View	Jackson	Sioux
Cook	*Kearney Military	Stella
Craig	Academy	Stratton
Curtis	Leigh	Stuart
Dawson	Liberty	Sutherland
DeWitt	Lynch	Talmage
Doniphan	McCool Junction	Tobias
Douglas	Mason City	Utica
Dunbar	Mead	Waterloo
Edison	Milford	Wausa
Eustis	Mitchell	Western
Ewing	Monroe	Weston
Florence	Morrill	Wilsonville
Ft. Calhoun	North Loup	Winside

* Additional credits may be secured by examination.

GENERAL SUGGESTIONS

NECESSARY LIMITATIONS OF COURSES

Ambitious principals and school boards naturally desire that their graduates receive the highest possible number of credits. Though commendable in itself, this has produced unfortunate results. It is not unusual to find a district attempting to carry too many years of high-school work. The limit should be the number of years that can be handled well by the high-school instructors that a district can afford to employ after providing properly for the lower grades. No high school can be permanently strong unless supported by efficient work in the grades. Not only should the number of years be limited, but the number of courses offered should not be increased merely to secure more credit points. Optional courses increase the number of recitations, unnecessarily reduce the size of classes, diminish the time the teacher can give to each class, and prevent the most thorough and efficient work. Variety of courses may be desirable, but thorough and skillful teaching is far more important. Where students' tastes and talents require it, one study may occasionally be substituted for another, even in small schools. As a rule, however, until classes are of such size as to require a division for efficiency in instruction, the board should adopt a single,

carefully selected curriculum and let the undivided energy of teachers and students be given to the pursuit of it. Especially is this true in the earlier years of the high-school. Later there may be a differentiation, but there should be the requirement that classes be of an economical size.

UNITING CLASSES

It is often immaterial which of two subjects comes first in order of sequence. Where classes are small, it is possible to make combinations that serve the ends of economy as well as improve the character of the instruction. Thus, physics and chemistry can be made to alternate, only one of them being taught in any year. Much time is required for preparing experiments in these sciences and for properly arranging the work for any class taught with enthusiasm and success. The plan here suggested enables the teacher to concentrate effort upon a small number of subjects. It has been thoroughly tested in a number of high schools and found to work admirably.

This suggestion is not intended for the largest high schools, yet there are few schools in the state which may not make some application of it.

The union of classes may render proper other useful variations from the program outlined in this manual.

TEXT-BOOKS

The subject of text-books should engage the careful attention of superintendents and principals; for, next to good teachers, satisfactory texts are the most essential elements in securing good results from school work. Not all the publications of any publishing house are equally good. It is folly to choose a work simply because it is published under certain auspices. It is equally fallacious to suppose that what is satisfactory in one place will be equally so in another. Like the length of courses, equipment, and other circumstances, school books must be adapted to particular environments.

LIBRARIES

A good school library is very desirable. The character of the books selected is of great importance. When funds are abundant it is not difficult to purchase, but with only fifty dollars to begin the work it is not easy to make a judicious selection. For those who must make each dollar count, a few suggestions may not be out of place.

1. Buy books as a carpenter buys tools—not in sets, not because others have them, but each for a specific purpose.

2. Distinguish between books for use from the laboratory and reference point of view and books for general reading.

Have some of each sort. The books for reference and formal supplementary reading broaden the mental horizon, permit comparison of authorities, and awaken and stimulate new interest in work. The books for general reading should be chosen for real interest and distinct literary value, and should have no immediate connection with studies.

The reading habit should be formed with the study habit. To awaken and fix the reading habit fully half of the library should consist of well-chosen books which do not in the least smack of the school room.

3. With only fifty dollars to spend, concentrate on some one subject and secure material for first-class work in this limited sphere. Fit up a complete shelf for Roman history, civics, American history, literature, or some other limited branch or portion of a subject. Next year do the same thing for another subject and continue this policy. Fifty dollars a year for twenty years scattered promiscuously, a book here and a book there, will not build up a serviceable working library or stimulate instructors to use such. Many a library seems to have books in plenty, when in reality either there are not enough on any one subject to render collateral work practicable, or they are not of the right kind.

4. Remarks on libraries for the high school apply with equal force to books for the grades. Each room should have access to an up-to-date library.

5. A wide acquaintance with juvenile literature is helpful in selecting to advantage. There is no use in buying what students do not read, and it is criminal to buy books without point or literary flavor. Students do not read books that are stupidly or ponderously written, but they are quite capable of reading with zest and profit much literature that is thought by some to be above them.

6. The librarian of the University is glad at all times to help teachers in the selection of books, to send "best books" lists on any subject, or to furnish data as to prices and editions. One of the very best lists of good books for school libraries and arranged by grades from the first to the twelfth grade is issued by the Nebraska Public Library Commission and may be had free by addressing the Secretary of the Commission at Lincoln. It gives prices at which reputable firms sell the books and full directions for ordering.

Reference Books

The following titles are suggested as a minimum list of reference books for the high school, and the purchase of them would be perhaps the most profitable expenditure of \$100 for this purpose:

- Atlas. Universal Atlas of the World. Rand, McNally, \$6.
Imperial Atlas of the World; same firm. About \$1.25.
The Century Atlas, \$12.50.
Dictionary. New International Dictionary. G. & C. Merriam, \$12. Last edition with supplement. The Standard Dictionary. Funk & Wagnalls, \$12. Collegiate Dictionary. Merriam, \$3, very serviceable. The Students' Standard Dictionary. Funk & Wagnalls, a treasure, \$2.50.
Encyclopedia. New International Encyclopedia. 20 vols. Dodd, Mead & Co., \$100. Nelson's Loose-leaf Cyclopaedia. 12 vols. \$84. Thomas Nelson & Sons.

- One of these two leading encyclopedias should be in every high-school library. Recent or even the latest editions can often be bought at less than prices quoted above. For particulars address the librarian of the University.
- Bartlett, John. Familiar Quotations. Ninth edition, \$2.
- Ploetz, Carl. Epitome of Ancient, Medieval, and Modern History, \$3.
- Roberts, H. M. Rules of Order. Scott, 50 cents.
- Roget, P. M. Thesaurus of English Words and Phrases. Longmans. New edition, 1901, \$3. One of the best books of synonyms.
- Statesman's Year-Book. Macmillan, \$3. Contains statistical and descriptive matter relating to all countries.
- United States Statistical Abstract.
- United States Congressional Directory. Your congressman should be able to get you the latest edition of these two valuable reference books.
- United States Census Office. Abstract of the Twelfth Census; Statistical Atlas of the Twelfth Census. If the Census Office at Washington will not send you these two volumes, apply to your local congressman.
- Who's Who in America. Last edition. Maquis, \$2.75.
- World's Almanac. New York World, 25 cents (paper), 50 cents (cloth). A wonderful amount of varied and accurate information.

COURSES OF STUDY

The following courses of study in the subjects for which entrance credit is granted have been prepared or revised by committees appointed jointly by the University of Nebraska, the State Department of Education, and the Superintendents and Principals' Association. They aim to specify in each subject the quantity, quality and method of work that will produce the greatest possible educational value, and that will permit evaluation in a scheme of course units. It is, however, to be borne in mind that no department in the University of Nebraska discriminates against pupils entering upon its work who have been trained in methods differing from those favored by the department. Power, mentality, the ability to take up and successfully carry forward university work—this rather than acquaintance with any particular method, is the chief requirement for matriculation.

AGRICULTURE

The recently adopted entrance requirements of the University make possible a great change in the course of study in agriculture in the high schools of the state. Formerly not more than one credit point was possible in this subject. Under the new requirements, subjects which local conditions demand may constitute twelve of the thirty required entrance points if such subjects be well taught, with proper equipment and well-trained teachers. In most high schools in Nebraska, local conditions demand that agriculture be the element of vocational training to be

introduced into the high schools and united with the cultural element in the course of study. Where the high school does the work it should in the community, functioning as a finishing as well as a preparatory school (for it must always be a finishing school for a great majority of its students), it should devote about one-fourth of its time to vocational work. In Nebraska this means that one five-hour subject each year should be agricultural in a large proportion of the high schools. It is apparent, however, that this cannot be accomplished at once. Most high schools will find it necessary to put in two years or even only one year of agricultural work. The outlines herewith, however, provide first for a four-year course, then a two-year course, and a one-year course. For high schools which find it necessary to continue the one-semester course, the former outline in the old Manual will suffice. Very few high schools can at present adopt the complete four-year course. However, it should be the ideal toward which every high school in an agricultural community should work. The two-year course will be possible to a limited number, and the great majority will probably use the one-year course. These latter courses are merely suggestive, and it is strongly recommended that high schools adopt for the subject matter of the two-year and one-year course such subjects outlined in the four-year course as local conditions make most profitable.

TEACHER OF AGRICULTURE

The first requisite in the successful teaching of this fundamental subject is a specially trained man, a graduate of an agricultural college if possible. He should be a man who can work with the farmers of the community and secure their confidence and cooperation. He should be large enough in his views not to assume that he knows all there is to know about agriculture and that the practice and experience of the farmers with whose children he is working counts for nothing. Instead of taking an attitude of authority on all agricultural subjects, he should take the attitude of the true student—that of the leader of a class of learners, himself a seeker after knowledge. It is only by so doing that he will be given the confidence and the cooperation of his farmer constituency.

Very frequently schools wishing to begin agricultural courses will not be able to secure college graduates in agriculture to take charge of the work. In such cases a man thoroly in sympathy with farm life, with practical experience on the farm, who has had a thoro training in botany, chemistry, and physics, should be secured. He should immediately get all the agricultural training possible in summer sessions at the University and from agricultural extension courses. Quite effective courses may thus be begun in schools where the necessity of waiting for a technically trained man would make their introduction for a long time impossible. The basis of success in cases of this kind will be the ability of the teacher of agriculture to cooperate with the farmer constituency of the school.

DEMONSTRATION FARM

In Minnesota the Putnam Act provides for a state appropriation, to be paid to a certain number of high schools which maintain approved courses in agriculture and home economics. Each of these high schools must have a demonstration farm of not less than five acres. The Nebraska high schools which teach agriculture should have demonstration farms of not less than five acres. Holdrege and Tecumseh high schools have led the way in this very important matter, and in the establishment of their new courses in agriculture have begun with demonstration plots of twelve and seven acres, respectively. Where it is impossible for a school to buy or rent such a plot of ground, vacant town lots, which frequently grow up in weeds, can often be secured thru the cooperation of progressive citizens or thru the commercial club of the town.

LIBRARY AND TEXT-BOOKS

The agricultural library should consist of a few very usable and slightly technical reference books. A few good books and bulletins which are used bring much larger results than many shelves of technical and unusable references.

Special text-books in each of the subjects which constitute agricultural instruction, rather than a general text, should be used. Bulletins of the Nebraska Experiment Station can be had free, and likewise the Farmers' Bulletins of the United States Department of Agriculture. These should be constantly made use of.

LABORATORY

Much of the laboratory work in agriculture will of necessity be upon the demonstration plot, in the home garden and experimental plots, and with live stock and machinery on the neighboring farms, but some additions to the regular laboratory equipment of the high school as indicated under the outlines for the various topics will be necessary. The outlay for this equipment, however, will not be large.

Laboratory periods should be the same as in other laboratory subjects,—chemistry, physics, etc.; that is, a double period twice a week.

COURSE OF STUDY

First Year

Animal Husbandry, 24 weeks. Horticulture, 12 weeks.

(Three recitation periods and two double laboratory periods per week. During a part of the course in Animal Husbandry it will be necessary for the stock judging to be carried on in successive laboratory periods. The recitations missed at this time can be added at other times.)

Animal Husbandry—**Topics:****A. Cattle.**

(1) Beef, market and feeding, 5 weeks. (2) Dairy, 5 weeks.

B. Swine, 4 weeks.**C. Sheep, 3 weeks.****D. Horses, principal draft type, 4 weeks.****E. Poultry, 3 weeks.**

An outline like the following should be made in the study of each of the above types of farm animals:

1. Various important breeds of each, with brief history of their origin and development.
2. Judging the various types of farm animals and use of the score card.
3. Principles of feeding and the "balanced ration."
4. Handling and care of animals.

Equipment and Material:

Access to Animals—Until the high schools can own their own live stock, it will be necessary to take the class in Animal Husbandry to farms where good, pure-bred stock of the various types and breeds can be seen. When the judging is begun, the class should be given the privilege of scoring by use of the official score cards some of the best specimens of each type which the community affords. Almost all breeders of pure-bred animals will gladly cooperate with school superintendents and principals in granting the use of their stock for this purpose.

Charts and Drawings—Class interest is greatly stimulated if good drawings taken from Experiment Station Bulletins, showing the points to be observed in stock judging, are used in preparing the class to use the score cards. These charts can be easily made on chart cloth with crayon or ink.

Score Cards—Official score cards as used by the Animal and Dairy Husbandry Department of the University of Nebraska should be used in all the judging. Schools may obtain free samples of these cards by writing to the School of Agriculture of the University of Nebraska. Supplies for student use can then be printed from these.

References:

Types and Breeds of Farm Animals. Plumb. Ginn & Co., Chicago.

Live Stock Judging for Beginners. Purdue Extension Circular No. 29. Purdue University, Lafayette, Ind.

Judging Live Stock. Craig. Kenyon Printing Co., Des Moines, Iowa.

Extension Bulletin No. 5. Department of Agricultural Extension, University of Nebraska, Lincoln.

Dairy Cattle and Milk Production. Eckles. Macmillan.

Types and Breeds of Dairy Cattle. Farmers' Bulletin No. 106, United States Department of Agriculture.

Horticulture—(By V. V. Westgate.)**Topics:**

- A. Plant Propagation, 3 weeks.
- B. Fruits, 4 weeks.
- C. Ornamentation of Home and School Grounds, 2 weeks.
- D. Home and School Gardens.

Equipment and Materials:

Home and School Garden—The demonstration farm should have a part set aside for a school garden. Individual plots should be used by students if space permits. Individual gardens at home should be used for experimentation, in raising vegetables and fruit for profit, and for contesting in state and county fairs by all students.

Laboratory—Class should use the regular or a special laboratory and have a cellar storeroom if possible.

Equipment:

- Fruit, vegetables, flowers.
- Seeds of vegetables, flowers, and trees.
- Apple stocks and scions for grafting.
- Willow cuttings for budding.
- Various bulbs, corms, tubers, etc.
- Vegetables for storing.
- Flowerpots and shallow boxes for plants and seedlings, cuttings, etc.
- Earthen plates and blotting paper for seed testing.
- Tin cups for making grafting wax.
- Glass beakers or tumblers for making spraying materials.
- Garden loam, rotted sod, fine manure, and sand for growing plants.
- A pair of pruning shears, a saw, two grafting knives, twelve budding knives, a razor strop, six dibbers, six hoes, six rakes, a spade, a shovel, a garden line and reel, and a wheel hoe.
- Materials for spray mixtures: One peck quicklime, five pounds copper sulphate, one pound Paris green, soap, and kerosene.
- Materials for grafting wax: Two pounds resin, one pound beeswax, one pound tallow, wrapping cord for budding, knitting cotton for grafting.

References—The following list of publications should be obtained by the schools for reference work:

1. The Farmers' Bulletins of the Department of Agriculture relating to Horticulture. (Send to the Department of Agriculture, Washington, D. C., and have them forward all such available bulletins. Also request them to place your name on their list for all future bulletins on horticultural subjects as they are published.)
2. The Annual Reports of the Nebraska State Horticultural Society. (These may be obtained from the secretary of the society, Lincoln, Nebraska.)

3. The bulletins of the Nebraska Experiment Station on horticultural subjects. (Write to the "Director of Agricultural Experiment Station," Lincoln, Nebraska, and have your name put on the mailing list for all such bulletins.)

The above reports and bulletins may be obtained free of charge. In addition to these, the following books should be in the school library:

1. Principles of Fruit Growing. Bailey. Macmillan & Co., Chicago.

2. How to Make a Fruit Garden. Fletcher. Doubleday, Page & Co., Chicago.

3. The Pruning Book. Bailey. Macmillan & Co., Chicago.

4. The Nursery Book. Bailey. Macmillan & Co., Chicago.

5. Principles of Vegetable Gardening. Bailey. Macmillan & Co., Chicago.

6. Landscape Gardening. Waugh. Orange-Judd Co., Chicago.

The entire list of books mentioned above may be obtained for about ten dollars.

Second Year

Soil and Farm Crops, 30 weeks. Plant and Animal Improvement, 6 weeks.

(Three recitations and two double laboratory periods.)

Soils and Farm Crops—

Topics:

A. Corn. Six weeks in fall season, six weeks at the beginning of the second semester.

B. Wheat and other small grains, 10 weeks.

C. Grasses, 4 weeks.

D. Legumes, emphasizing alfalfa, 4 weeks.

An outline such as the following should be used in studying each of the above list of crops. The topics under "General Studies" should be touched upon very briefly; other topics should be taken up thoroughly and in detail:

1. General Studies.

a. Botanical relationship and historical development.

b. Structure and physiology.

2. Breeding Methods.

a. Seed selection and storage.

(1) Examining, identifying, grading, and testing grains; use of score card for corn. (2) Adaptation to Nebraska conditions. (3) Germination test for corn. (4) Ear-to-row method of corn breeding and other methods of cereal breeding. (5) Home breeding plots and corn contests.

3. Cultural Methods.

- a. Soil physics and the seed-bed.
- b. Soil moisture.
- c. Methods of planting and tillage.
- d. Crop enemies, especially weeds and insects.
- e. Rotation and yields.

Equipment and Material:

Breeding Plots—On the demonstration farm, breeding plots for corn, wheat, and other crops should be maintained. Students should also have their own breeding plots at home wherever possible. They should use these in the raising of corn for the state, county, and local corn contests.

Laboratory Equipment and Material—

Glass plate (window glass cut into 4 and 8-inch squares).

One compound microscope, three hand lenses and two dozen glass slides.

Two dozen flowerpots, 75 cents—\$1.50 (tin fruit cans may be used).

Three thermometers, graduated to 100 C., \$1—\$3.

Soil auger, 1½ with 42-inch shank, about \$2.

Five ¾-inch glass tubing, 3 or 4 feet long.

Five galvanized iron cylinders, 10 inches in diameter, 30 inches long, 50 cents each.

One-half dozen pint tin cups.

One so-called spun iron crucible, about 25 cents.

One dozen 4-ounce wide-mouthed bottles, about 50 cents.

One dozen 8-ounce wide-mouthed bottles, about 60 cents.

One graduate, 200 c. c., about \$1.50.

One solution balance, 20 kilo, at \$20.

Soil, sand, gravel, loam, clay, compost, or well-rotted manure, air-slacked lime, common salt, sawdust, and straw.

Dent corn for placing and judging ears. Ten ears of two varieties for each pupil. Reid's Yellow Dent for one variety.

Commercial grades of corn in lots of one peck each; yellow and white corn, Nos. 1, 2, 3; mixed corn, Nos. 1, 2, 3, 4.

Ears of pod, flint, flour, pop, sweet, and dent corn.

Threshed wheat, one-half peck lots, of the following kinds: durum, northern spring, hard winter, white winter, red winter.

Wheats in head, one for each pupil: Polish, common, durum, emmer, and einkorn.

Commercial grades of wheat in lots of one peck each: spring and winter, Nos. 1, 2, 3, 4, and rejected.

Side oats and open panicle oats, one head for each pupil.

Commercial grades of oats in lots of one peck each: white and mixed oats, Nos. 1, 2, 3, 4.

Two-row and six-row barleys, one head for each pupil.
Threshed barleys, in lots of one peck each: hulled, hull-less, bleached, sprouted, sound, and properly colored.

Twelve kinds of grass seed, preferably those growing in vicinity; at least 100 seeds of each kind for each pupil: brome, timothy, Kentucky blue, orchard, meadow fescue, red top, rye, wheat, Johnson, tall meadow, oat, sheep fescue, crested dog's tail, etc.

Japanese, German, Hungarian, Siberian, and broom-corn millets; red, mammoth, white, alsike, sweet, crimson, yellow, burr, Bokhara, Japan, and sanfoin clovers, and common and Turkestan alfalfa seed.

References:

The Cereals in America. Hunt. Orange-Judd Co., Chicago.

Examining and Grading Grains. Lyon and Montgomery. Ginn & Co., Chicago.

The Soil. Lyon and Fippin. Macmillan Co., Chicago.

Bacteria in Relation to Country Life. Lipman. Macmillan Co., Chicago.

Soils and Fertilizers. Snyder. Macmillan Co., Chicago.

Classified List of Free Publications for the Use of Teachers, Circular 94, Office of Experiment Stations, Washington, D. C.

Experiments with Corn. Bulletin 112. Nebraska Experiment Station, Lincoln.

Native Seed Corn. Bulletin 126. Nebraska Experiment Station, Lincoln.

The Germination Test for Seed Corn. Extension Bulletin 3. Nebraska Experiment Station, Lincoln.

Corn, Etc. Extension Bulletin 5. College of Agriculture, Lincoln.

Seed Corn. Farmers' Bulletins 415 and 229. United States Department of Agriculture, Washington, D. C.

Plant and Animal Improvement—

Topics:

A. Common plant diseases and treatment.

(1) Potato scab, oat smut, etc.

B. Improvement of crops by careful selection and breeding.

(Emphasize more fully and in detail the work begun earlier under Farm Crops—Breeding Methods.)

C. Common animal diseases and treatment.

(1) Use of hog cholera serum, etc.

D. Principles of breeding by careful selection and crossing.

(1) Value of pure-bred sires, etc.

Equipment and Material:*

References:*

*Write Nebraska Experiment Station for Material and References on this course, also see supplementary Manual on Industrial Training to be published later by State Superintendent and the University.)

Third Year

The Farmstead, 24 weeks. Farm Machinery, 12 weeks.
(Three recitations and two double laboratory periods.)

The Farmstead—(By L. W. Chase.)

Topics:

- A. Arranging and handling fields.
- B. Farm Architecture.
 - (1) Arranging buildings. (2) Planning buildings.
 - (3) Building materials, with uses. (4) Water systems. (5) Sanitation. (6) Heating and ventilation. (7) Lighting. (8) Fencing.
- C. Surveying.
- D. Drainage.
- E. Roads.

Farm Machinery and Farm Motors—(By L. W. Chase.)

Topics:

- A. Units.
- B. Machinery.
 - (1) Tilling. (2) Seeding. (3) Harvesting. (4) Threshing. (5) Wagons.
- C. Farm motors.
 - (1) Windmills. (2) Steam and internal combustion engines. (3) Traction engines.

Equipment and Material:

The demonstration farm and the farm home of the student should constitute the laboratory for the major portion of the course. Implements at the establishment of the local dealer can usually be secured for the Farm Machinery work. The supplementary high school manual on industrial work to be published later by the State Department of Public Instruction and the University will contain a more detailed outline of the method of work in the course.

References:

- Farm Buildings. Orange-Judd Co., Chicago.
- Heating and Ventilating Residences. J. D. Hoffman. Lincoln, Nebraska.
- Concrete About the Home and On the Farm. Universal Portland Cement Co., 30 Broad St. New York.
- Farm Drainage. Elliott. John Wiley & Sons.
- Farm Machinery and Farm Motors. Davidson and Chase. Orange-Judd Co., Chicago.
- Sand and Clay Roads in the Middle West. Farmers' Bulletin No. 91, U. S. Department of Agriculture.
- Sand Clay and Burnt Clay Roads. Farmers' Bulletin 311, U. S. Department of Agriculture.
- Use of Split Log Drag on Earth Roads. Farmers' Bulletin 321, U. S. Department of Agriculture.
- Macadam Roads. Farmers' Bulletin 338, U. S. Department of Agriculture.

Fourth Year

Soil Fertility and Permanent Agriculture, 24 weeks.
Dairying, 12 weeks.

(Three recitations and two double laboratory periods.)

Soil Fertility—(By P. B. Barker.)

Topics:**A. Crop requirements.**

- (1) Ten essential plant food elements. (2) Six plant food elements derived from soil particles. (3) Nitrogen. (4) Amounts of each element removed by each of the following named: corn, wheat, oats, alfalfa, clover.

B. Fertility of Soils.

- (1) Factors determining crop producing power of soils. (2) Amounts of each of the following named in average soils: nitrogen, phosphorus, potash, calcium, magnesium, iron, and sulphur. (3) Elements most frequently deficient.

C. Availability of plant-food elements.

- (1) Fertilizers. (2) Crop rotations. (3) Tillage. (4) Drainage. (5) Soil water. (6) Organisms. (7) Soil air. (8) Soil temperature. (9) Soil management.

Equipment and Material:

Very little or no additional equipment to that required in "Soils and Field Crops" for the second year is required in this course.

References:

Soil Fertility and Permanent Agriculture. Hopkins. Ginn & Co., Chicago.

Fertilizers and Field Crops. Van Slyke. MacMillan Co., Chicago.

First Principles of Soil Fertility. Vivian. Orange-Judd Co., Chicago.

See list of publications. Office of Experiment Stations. Circular 94, U. S. Department of Agriculture.

Dairying—(By J. H. Frandsen.)

Topics:**A. Composition and General Characteristics of Milk.**
(Six weeks, with laboratory exercises.)

- (1) Use of the Babcock test. (2) The lactometer and its use. (3) Cream ripening and churning. (4) Packing and marketing of butter.

B. Dairy Cattle and Milk Production, 6 weeks.

- (1) Starting a dairy herd. (2) Selection of the individual cow. (3) Selection of the herd bull. (4) Calf raising. (5) Best development of the dairy heifer. (6) Management of dairy cattle. (7) Feeding for milk production. (8) Stables for dairy cows. (9) Common ailments of dairy cattle. (10) "Pedigrees," "The Registry of Merit," and "The Advanced Registry Official."

Equipment and Material:

For dairy laboratory the regular chemistry or physics laboratory may be used. It should be equipped, however, with the following list of special dairy apparatus:

12 bottles-Agos-cast-iron covered Babcock tester, A. H. Barber Co., Chicago, or 12 bottles-Facile tester, J. G. Cherry Co., Cedar Rapids, Iowa—\$14.00.

Milk bottles, cream bottles, pipettes and acid necessary to accompany tester, A. H. Barber Co., Chicago, or J. G. Cherry, Cedar Rapids, Iowa.

6 lactometers and lactometer jars. Sample tubes for milk samples, same companies.

5-8 gallon churn and hand worker, same companies.

1-15 gallon jacketed vat, Omaha Creamery Package Co., Omaha, Neb.

For laboratory work under "B" of the course of study the student should have access to pure bred dairy cattle in the vicinity of the school. Students should weigh and test milk from the cows of such herds and in their own laboratory calculate the butter fat produced by each cow. Suitable rations for these cows should also be computed by students.

References:

Dairy Cattle and Milk Production. Eckles. Macmillan Co., Chicago.

Types and Breeds of Dairy Cattle. Farmers' Bulletin, U. S. Department of Agriculture, Washington, D. C.

Dairy Chemistry. Snyder. Macmillan Co., Chicago.

Feeds and Feeding. Henry. Macmillan Co., Chicago.

Bulletins on Dairying from Nebraska Experiment Station.

The Committee wishes to recommend to superintendents and principals the largest liberty in the inauguration of new courses in agriculture in their respective high schools. Accordingly the preceding rather extensive four-year course has been suggested. Principals and superintendents should feel at liberty to change the order of subjects where there are good reasons for it and where such change would make the course more effective. The course in agriculture should, above all things, be adapted to local needs. In some high schools where there is a large rural element in the student body, it may be wise to make the course in agriculture cover two years, with two agricultural studies each semester. The whole four-year course as recommended above could then be completed by farm boys in two years. The order of the course would be as follows:

First Year

First Semester
 English
 Algebra
 Soils and Farm Crops
 Animal Husbandry

Second Semester
 English
 Algebra
 Animal Husbandry, 6 weeks
 Soils and Farm Crops, 12 weeks
 Horticulture, 12 weeks
 Plant and Animal Improvement, 6 weeks

Second Year

English
 Geometry
 The Farmstead
 Soil Fertility and Permanent Agriculture

English
 Geometry
 The Farmstead, 6 weeks
 Farm Machinery and Motors, 12 weeks
 Soil Fertility and Permanent Dairying, 12 weeks
 Agriculture, 6 weeks

Many schools may desire to start a two-year course with one agricultural subject each semester. In such a course the subject should be taken up much as suggested in the outlines in the four-year course, but naturally not so exhaustively. The same equipment and material, references, etc., are necessary.

First Year

Animal Husbandry, 18 weeks. Farm Crops, 18 weeks.

Second Year

General Agriculture, 36 weeks.

General Agriculture should include:

- (1) Horticulture. (2) The Farmstead. (3) Farm Machinery and Farm Motors. (4) Plant and Animal Improvement. (5) Soil Fertility and Permanent Agriculture. (6) Dairying.

(See outline in four-year course.)

For schools desiring a one-year course only, the following plan is suggested:

First Semester

Animal Husbandry, 9 weeks. Soils and Farm Crops, 9 weeks.

Second Semester

General Agriculture, 18 weeks.

(This course should take up briefly the same subjects as suggested in the outline in the two-year course in General Agriculture.)

ASTRONOMY

Astronomy is a difficult subject to teach in the high school. It is an inherently mathematical subject. Not that it should involve many problems or formulae; it is better to leave these mainly for more advanced work. Yet, inevitably, astronomy is full of geometrical conceptions which we can not avoid; real motions in space and the resulting apparent motions on the sphere must be clearly comprehended and correlated. The pupil must learn to infer the real from the apparent, the apparent from the real. The teacher of astronomy should be able to discover and remove the pupil's difficulties, especially that of passing from the real to the apparent and from the apparent to the real.

To meet this need, two lines of collateral study are almost indispensable, a frequent use of the celestial globe and considerable observational work in the sky itself. The pupil should know the principal constellations; should observe and chart on star maps the motions of planets; should determine by observation, however roughly, the latitude of his town. Such laboratory manuals as Wilson's "Laboratory Astronomy" (Ginn & Co.), Swezey's "Practical Exercises in Astronomy" (Appleton), or Byrd's "Laboratory Manual in Astronomy" (Ginn & Co.), will help the teacher to teach by observation. Some textbooks on astronomy give a few suggestions of the sort, especially Comstock's "A Text-Book of Astronomy" (Appleton), and Todd's "New Astronomy" (American Book Co.). Both are excellent texts.

No school should undertake astronomy without having in the library some star atlases, in the laboratory a celestial globe, and in the teacher's chair some one who knows how to use them. Upton's "Star Atlas" (Ginn & Co.), or Klein's "Star Atlas" (Young & Co., New York), are good. Less elaborate maps, but probably more useful for the beginner, are given in Swezey's "Manual" and in Young's "Lessons in Astronomy," but as a textbook Young's "Manual of Astronomy" is better than his "Lessons in Astronomy."

"The American Ephemeris and Nautical Almanac," published by the Nautical Almanac Office, Washington, at one dollar a year, will prove a great fund of exact information about the actual positions and motions of the heavenly bodies. "Popular Astronomy," a monthly magazine published at Northfield, Minn. (\$3.50 a year), will give much interesting reading and current information about the heavens and about astronomical work. The following books of a popular sort would be valuable for collateral reading:

Ball. The Story of the Heavens. Cassell & Co., \$5.

Gore. The Visible Universe. Macmillan, \$3.75.

Langley. The New Astronomy. Houghton, Mifflin & Co., \$5.

Lowell. Mars. Houghton, Mifflin & Co., \$2.50.

Ball. Great Astronomers. Isbister, 7s. 6d.

- Newcomb. The Stars. Murray, London.
Flammarion. Astronomical Myths. Macmillan.
Maunder. The Royal Observatory. Religious Tract Society, London.
Gore. Flammarion's Popular Astronomy. Chatto & Windus, 16s.
Jacoby. Practical Talks by an Astronomer. Scribner.
Clerk. Problems in Astrophysics. A. & C. Black.
Hale. Stellar Evolution. University of Chicago Press.

BOTANY

Time—Preferably one year should be given to botany. It is better to begin with the opening of the fall term and continue as a full study to the end of the school year, covering two credit points. Where it is impossible to give this much time to botany, the work may alternate with some other subject, and one point may be covered. Even in such case it is better to begin the study in the fall.

Here as elsewhere, a "credit point" must include not less than three class periods per week, for recitations, lectures, quizzes, etc., and four periods (preferably two double periods) per week for the laboratory work.

The Laboratory—Modern botany requires a properly equipped laboratory. This must be well lighted, preferably from the north sky, and should be provided with firm tables, 27 or 28 inches high, and needful shelves and cases at the sides of the room.

The **microscopes** should be from some good maker, so as to secure good results. Each microscope should have two objectives (low and high powers), and at least a fine adjustment. Coarse adjustment by rack-and-pinion, and double nose-pieces while convenient are not indispensable. It is a waste of money to purchase "immersion objectives" or "mechanical stages" for the use of high-school pupils. It is quite desirable that there should be one or more simple eye-piece micrometers in the laboratory to enable the pupils to make measurements of objects.

Microscopes such as are here recommended may be purchased of American makers (as Bausch & Lomb Optical Company, Rochester, N. Y., or Spencer Lens Company, Buffalo, N. Y.) for about \$25, or from German makers (as Leitz, Reichert, or Zeiss) for a little less when imported free of duty. It is recommended that in all cases the purchases should be made **directly from the makers** so as to avoid paying commissions to middlemen.

There should be provided with each microscope a set of **dissecting instruments**. Good dissecting sets are made by the firms mentioned above, each containing a scalpel, forceps, scissors, needles, and pipette, and sold for about \$1. The usual glass slips, cover-glasses, alcohol, reagents, etc., should be freely supplied. These need not cost more than \$1 for each microscope.

Some work may be done by the class under the direction of the well-prepared teacher, with but one microscope and the other appliances, but as soon as possible there should be in every high school several microscopes, each with its accessories. There should be at least one-fifth as many microscopes as there are students in the class. Of course, it is understood that in each laboratory exercise each pupil has the exclusive use of one microscope.

It is very desirable that every botanical laboratory should have a **School Herbarium** which contains authentically named specimens of all the plants of the region, and it should be the ambition of the classes in botany to add to this each year. The University will be glad to aid its accredited schools in this matter.

The Laboratory Work—The aim is to give the student a general outline of modern botany, including a fair knowledge of the principal types of plants and the modifications they have undergone. For this purpose the teacher should have an abundance of material properly prepared for class use. Some of it may be preserved in alcohol (50 per cent) or formalin (4 per cent), while much more may be in the form of dried herbarium specimens. As far as possible, however, it is better to have fresh material, which should be kept growing in the laboratory, or brought in at frequent intervals.

The **standard course** of thirty-six weeks' work should be something like the following:

First Semester

- *1. Plant cells and their contents.
- 2. The kinds of plant cells (tissues).
- *3. The lowest plants—the blue-greens.
- *4. The lower green plants—the green slimes.
- *5. The pond scums.
- 6. The green felts.
- *7. The lower fungi.
- 8. The seaweeds.
- *9. The sac-fungi.
- *10. The rusts.
- 11. The smuts.
- 12. The puffballs.
- *13. The mushrooms.
- 14. The lichen-fungi.
- *15. The mosses.
- *16. The ferns.

Reviews.

Second Semester

- 17. The young pine cones.
- 18. The mature pine cones.
- 19. The leaves of pines.
- *20. }
- *21. } Class work on the forms of
- *22. } leaves, flowers, and fruits.
- *23. }

- *24. Easter lilies.
- *25. Buttercups.
- *26. Carnations.
- *27. Lilacs, and ash trees.
- *28. Strawberries.
- *29. Roses and apples.
- *30. Dandelions.
- 31. Seeds.
- *32. Seedlings.

Reviews.

Where but one semester can be given to the work, those topics marked with an asterisk (*) should still be included, but those from 20 to 32 may be considerably shortened, without omitting any.

Drawings.—At every stage the student should be required to make careful drawings in his notebook, accompanied by **concise** descriptions of essential characters.

Laboratory Material.—The Department of Botany of the University will supply laboratory material to the accredited schools for cost of collection, preparation, and postage.

Field Work and Herbarium.—Each student should have some practice in the collection and preservation of specimens. He should learn the art of herborization by actual field work, and should have enough practice in the drying, mounting, and labeling of specimens to do the work satisfactorily. Where there is little or no such systematically arranged laboratory work as is outlined above, each student should prepare, as a result of his field work, a herbarium of at least one hundred species, mounted on standard herbarium sheets ($11\frac{1}{2}$ by $16\frac{1}{2}$ inches), and properly labeled. Such paper of the proper weight, and already cut to the exact size may be bought at a reasonable figure from the Nebraska School Supply House in Lincoln.

Where the student performs the laboratory work indicated above, it is sufficient to prepare thirty-five specimens. The specimens should consist of representatives of each of the larger groups of the vegetable kingdom.

Warning.—Teachers are warned that filling pages of "blanks" (found in so-called "herbariums") is not only unnecessary but wholly unscientific. No botanist uses such blanks in preparing his descriptions, and pupils certainly should not be required to do so. On the label (about 2 by 4 inches in size) should be written (1) the scientific name, (2) the common name, (3) habitat, (4) locality, (5) date, (6) collector's name. This is far better than to fill perfunctorily a "blank" with unnecessary data and inconsequential remarks.

The Botanical Library.—Each accredited school should have a carefully selected library of botanical books to which students may have access under proper restrictions. The following list will be helpful in the selection of books, those starred being recommended as valuable for use as text-books or manuals:

Arthur & MacDougal. *Living Plants and Their Properties.*

Useful for supplementary readings.

*Bergen. *Elements of Botany.* For ordinary schools.

- *Bergen and Davis. Principles of Botany. For advanced schools only.
- *Bessey. Elementary Botany. For smaller high schools. Contains also a manual of the genera of the common plants of Nebraska, from the lowest to the highest.
- *Bessey. Essentials of Botany. For advanced schools only.
- *Bessey. Outlines of Plant Phylea. Gives a condensed outline of the plant kingdom.
- *Britton. Manual of the Flora of the Northern States and Canada. Contains descriptions of all the ferns and flowering plants found growing wild in any part of Nebraska.
- *Caldwell. Handbook of Plant Morphology. For advanced schools only.
- Campbell. University Text Book of Botany. A large work, very useful for reference.
- Conn. Bacteria, Yeasts, and Moulds in the Home. For supplementary readings.
- Coulter. Plant Relations. Useful for supplementary readings by older pupils.
- *Coulter. A Text-book of Botany for Secondary Schools. Very good.
- Coulter, Barnes and Cowles. Text-book of Botany. One of the best reference books for the high school.
- Ganong. Laboratory Course in Plant Physiology. Contains many interesting experiments.
- Gray. New manual of Botany, seventh edition. Useful in the eastern tier of counties, but does not cover the whole state.
- Hall. How to Use the Microscope.
- *Leavitt. Outlines of Botany. For use in the less advanced schools.
- MacDougal. Elementary Plant Physiology. For supplementary readings by advanced pupils.
- MacDougal. Nature and Work of Plants. For supplementary readings.
- Osterhout. Experiments with Plants. Full of interesting experiments, many of which are easily made.
- *Petersen's Flora of Nebraska. Contains keys to all of our flowering plants. Very useful.
- Pinchot. Primer of Forestry. Gives an insight into this important field of botany.
- Sargent. Corn Plants. Useful for supplementary readings by young pupils.

To the foregoing should be added a subscription for the botanical journal, "The American Botanist," which is published at Joliet, Illinois.

A general magazine, "The Guide to Nature," published at Sound Beach, Conn., contains a good deal of elementary botany, as well as much about nature in general.

Teachers are urged to secure the bulletins relating to plants issued free of charge by the United States Department of Agriculture, Washington, D. C., the Nebraska Agricultural Experiment Station at Lincoln, Nebr., and those issued by the experiment stations of other states.

CHEMISTRY

If the student is to cover with reasonable thoroughness the generally accepted elementary course, he should spend at least seventy hours in lectures and recitations and ninety hours in the laboratory. This means practically that the class should meet for lecture or recitation three periods (forty minutes each) a week each semester, with two double periods a week in the laboratory throughout the year, or for class-room work six periods, and for laboratory four double periods a week for one semester. If the teaching is efficient, the equipment sufficient, and the work of the student satisfactory, the two-point requirement of the University for entrance is satisfied.

Lectures with good demonstrations of difficult and striking experiments and oral quizzes should be made about equally important portions of the class-room. The teacher's work should be based upon a good text-book. The laboratory work is the most important element in acquiring a good knowledge of the subject, either elementary or advanced, and should be given more time than is usually devoted to it in the high school. It should be based upon a good laboratory manual and should include experiments illustrating chemical truths, the characteristic properties of typical non-metals and metals and, if possible, a little rough quantitative work, and a brief study of a few of the commonest compounds of carbon.

The most important factor in securing efficient results from the study of the sciences in high schools is the teacher. A teacher insufficiently trained in science can not be expected to do good work even with unlimited funds. But the best of teachers should not be expected to teach without at least a certain amount of money for the purchase of equipment and chemicals. Furthermore, those who have the finances in charge must realize that each student in science will use up or destroy a certain amount of the laboratory supplies and that consequently the teacher must be allowed a sum each year for the replacement of the equipment thus used. Especially is this true in chemistry, where from three to five dollars a year (according to the condition of the original equipment) will be needed to replace what the student will necessarily use.

The Laboratory—The necessary laboratory furnishing need not be very expensive. Good light, solid tables, gas connection for every student if gas is to be had (otherwise good alcohol lamps), water both distilled and ordinary, and a sink not too far from the students' tables, plenty of case room for chemicals and apparatus, and a hood with good draft are the only essentials. The tables should be about forty inches high and, if possible, should be built with one shelf above for the common reagents, and with drawers and cupboards below so that each student may have his own set of apparatus, lock it up, and be responsible for it.

Apparatus and Chemicals—The amount and cost of chemicals and apparatus needed for the above mentioned work and based upon a certain number of students are given with a fair degree of accuracy in a number of laboratory manuals. For a class of ten students the cost of these materials need not be more than about \$100. Among the more reliable laboratory supply houses are the following:

E. H. Sargent & Co., Chicago, Illinois.
 Central Scientific Company, Chicago, Illinois.
 Denver Fire Clay Company, Denver, Colorado.
 Bausch & Lomb Optical Company, Rochester, New York.
 Scientific Materials Company, Pittsburg, Pennsylvania.
 Eimer & Amend, New York City.

If the school can afford to buy apparatus and chemicals in some quantity, say, to the amount of \$300 or \$400, it will pay to have the material imported from abroad. Under United States law it may be imported free of duty for teaching purposes by any educational institution. A very considerable saving may be thereby effected. The importing may be done direct or through some responsible house such as those mentioned.

The Library—Every high school should have a well-selected, even if small, chemical library. Students should have access to the books and be encouraged to consult them. The following list is suggested as a standard toward which the school should strive. Where funds are insufficient Nos. 1, 5, 6, 7 (or 8), 13, 14, 15, 17, and 18 may be at first omitted.

Reference Books

1. Roscoe and Schorlemmer. Treatise on Chemistry. Inorganic Part, Vols. I and II. Appleton, \$10.
2. Holleman and Cooper. Text-book of Inorganic Chemistry. Wiley, \$2.50.
3. Remsen. Advanced Course. Holt, \$2.80.
- or
- Newth. Text-book of Inorganic Chemistry. Longmans, Green & Co., \$1.75.
4. Remsen. Organic Chemistry. Heath, \$1.20.
5. Holleman and Walker. Organic Chemistry. Wiley, \$2.50.
6. Walker. Introduction to Physical Chemistry. Macmillan, \$3.25.
7. Benedict. Chemical Lecture Experiments. Macmillan, \$2.
8. Newth. Chemical Lecture Experiments. Longmans, Green & Co., \$2.
9. Dobbin and Walker. Chemical Theory for Beginners. Macmillan, 70 cents.
10. Ramsay. Experimental Proofs of Chemical Theory. Macmillan, 60 cents.
11. Ostwald. Foundations of Analytical Chemistry. Macmillan, \$2.
12. Venable. A Short History of Chemistry. Heath, \$1.

13. Venable. The Periodic Law. Chemical Publishing Co., \$2.50.
14. Prescott and Johnson. Qualitative Chemical Analysis. Van Nostrand, \$3.50.
15. Olsen. Quantitative Analysis. Van Nostrand, \$4.
16. Smith and Hall. Teaching of Chemistry and Physics in Secondary Schools. Longmans, Green & Co., \$1.50.
Kahlenberg. Outlines of Chemistry. Macmillan, \$2.60.
Smith. Introductory Inorganic Chemistry. Century, \$2.25.
Jones. Introductory to Physical Chemistry. Macmillan, \$1.25.
17. Thorpe. Dictionary of Applied Chemistry. 3 vols. Longmans, Green & Co., \$50.
18. Watt. Dictionary of Chemistry. 4 vols. Longmans, Green & Co., \$50.

Text-books and Laboratory Manuals

- Remsen. Briefer Course. Holt, \$1.12.
Williams. Elementary Chemistry (with experiments). Ginn & Co., \$1.10.
Clarke and Dennis. Elementary Chemistry. American Book Co., \$1.10.
Dennis and Clarke. Laboratory Manual. American Book Co., 50 cents.
Bradbury. Elementary Chemistry (with experiments). Appleton, \$1.25.
Hessler and Smith. Elementary Chemistry (with experiments). Sanborn, \$1.20.
Newell, L. C. Descriptive Chemistry. Heath, \$1.20. Part I, \$1; Part II, 40 cents.
Peters. Modern Chemistry. Merrill, \$1.10.
Peters. Laboratory Manual. Merrill, 60 cents.
Brownlee and Others. First Principles of Chemistry. Allyn & Bacon, \$1.25.
(Separate "Laboratory Exercises" 50 cents.)
McPherson and Henderson. Elementary Study of Chemistry. Ginn & Co., \$1.25.
(“Exercises in Chemistry” separate 40 cents.)
Godfrey. Elementary Chemistry. Longmans, Green & Co., \$1.10.
Morgan and Lyman. An Elementary Text-book. Macmillan (preparing).

CIVICS

Matter—The subject-matter should embrace national, state, and local government. When sufficient time is devoted to the study, the historical growth of each institution should be included.

(1) In general, the origin, provisions, and interpretation of the Constitution of the United States, in broad outline, should be fairly well mastered. Attention to the struggle for a stronger national government, during the so-called critical period preceding the convention of 1787, will greatly add to the interest. Careful attention should

be given to the actual workings of the Federal Government; while the origin and organization of political parties should be considered. The character and purpose of the Australian ballot, the direct primary, and the movement for proportional representation should be thoroughly understood. In like manner, the evils of the "spoils system" and the benefits of the "merit system" should be explained.

(2) The same general plan may be adopted in the study of the state constitution. Here, however, the work may be made more concrete; and it may be developed more from observation of actual government. In some schools "field work" in the form of conferences with public officers may be required. Often it may be found more practical to have copies of statistics from the tax collector, assessor, or other official than to ask a personal interview. Provision should be made for putting into each pupil's hands copies of ordinances passed by his governing body, sections of state or federal laws, legal forms of wills, mortgages, notes, abstracts of title, contracts, and the like. So far as practicable the student should come into personal contact with the various departments of the state government, legislative, executive, and judicial. Especial attention should be given to the provision made by the state for the poor, the unfortunate, the criminal and delinquent classes, and for the restriction of child-labor.

(3) The local government should be studied in detail, with some attention to the origin of the three types of local organization existing in the United States. Beginning with the school district, the work may be extended to the township, county, village, and city. The chief evils in American municipal government, with the more important remedies suggested, should be pointed out. In particular the nature and purpose of the initiative and referendum should be explained. About two-thirds of the time should be devoted to local government.

Method—A text-book may be placed in the hands of the class, but it ought to be supplemented by library readings, and when practicable, by some field work. A number of reference books is essential. Written examinations should be held frequently; and, where sufficient time is assigned to civics, carefully prepared special papers may be required. Each student should keep a notebook. The present tendency to raise civics and American history to the twelfth grade should be encouraged. Studies so essential as a training for good citizenship should be taken up when the mind of the pupil is most mature. It is highly desirable, for the same reason, that more time should be given to the subject. A separate full course in political science, as such, ought to find place in every four-year high school.

Text and Reference Books**1. For use as Texts.**

- Ashley, R. L. American Government. Macmillan Co., \$1.
*Ashley, R. L. The American Federal State. Macmillan Co., \$2.
Boynton, F. D. School Civics. Ginn & Co., \$1.
Boynton-Fulmer. School Civics. With the State and Local Government of Nebraska. Ginn & Co., \$1.
Fiske, John. Civil Government in the United States. Houghton, Mifflin & Co., \$1.
Forman, S. E. Advanced Civics. Century Co., \$1.25.
*Hinsdale, B. A. The American Government, National and State. American Book Co., \$1.25.
James, J. A., and Sanford, A. H. Government in State and Nation. Scribner Sons, \$1.25.
Lansing, Robert, and Jones, Gary M. Government, Its Origin, Growth, and Form in the United States. Silver, Burdett & Co., 72 cents.
Moses, Bernard. The Government of the United States. Appleton & Co., \$1.05.
Willoughby, W. W. The Rights and Duties of American Citizenship. American Book Co., \$1.
Young, A. W., and Clark, S. S. The Government Class Book. Maynard, Merrill & Co., \$1.05.

2. For Reference and Outside Reading.

- Bryce, James. The American Commonwealth. Abridged edition. Macmillan Co., \$1.75.
Dawes, F. G. How We Are Governed. Ginn & Co., \$1.
Goodnow, F. G. City Government in the United States. Century Co., \$1.25.
Harrison, Benj. This Country of Ours. Scribner's Sons, \$1.50.
Hart A. B. Actual Government. Longmans, Green & Co., \$2.
Leacock, Stephen. Elements of Political Science. Houghton, Mifflin & Co., \$1.75.
Macy, Jesse. Party Organization and Machinery. Century Co., \$1.25.
Stanwood, Edw. A History of the Presidency. Houghton, Mifflin & Co., \$2.50.
Wilson, Woodrow. The State. D. C. Heath & Co., \$2.
Woodburn, J. A. Political Parties and Party Problems. Putnam, \$2.

The Congressional Directory and House and Senate Manuals are packed with material on our government and may be obtained free by writing your congressman or senator.

The Statesman's Manual is of constant service.

* Rather heavy for any but advanced classes in a four-year school. Good for reference shelf where not used as the text, as are also Fiske, Forman, Moses, and Willoughby.

ECONOMICS

One has only to mention the leading questions of the day, as those concerning the tariff, the trusts, railways, municipal monopolies, money and banking, taxation, conflicts of labor and capital, socialism, political and social reform, to show that they are largely economic in their character; and for this reason, if for no other, the elements of economics should be taught in the high school. A good deal of instruction in this subject can be given in connection with work in English, geography, history, and civics, but it is probable that a regular course in economics should be given in the twelfth grade, and as early in the year as possible. Inasmuch as economic subjects are usually chosen for interscholastic debates, students preparing for these contests will be particularly interested, but many others will be glad to have some insight into the economic organization of society and the laws which govern industrial activity and development. Economics is the most exact of all the social sciences, the "new humanities," and is taking its place in the high-school course because of the interest which it arouses, its value as a discipline, its importance in the training of citizens and as an essential part of a liberal education.

The following text-books may be mentioned as among the best, with the suggestion that the students be asked to do some collateral reading in more advanced books and in magazines, where many articles of great interest may be found:

Text-books

- Raper, C. L. Principles of Wealth and Welfare. Macmillan, \$1.
 Burch, H. R., and Nearing, Scott. Elements of Economics. Macmillan, \$1.
 Thurston, H. W. Economics and Industrial History. Scott Foresman, \$1.
 Bullock, C. J. Introduction to the Study of Economics. Silver, Burdett, \$1.20.
 Seager, H. R. Economics, Briefer Course. Henry Holt, \$1.75.
 Ely and Wicker. Introduction to Economics. Macmillan.
 Taylor, W. G. L. Exercises in Economics. The University Publishing Co., Lincoln.

Books of Reference

- Ely, R. T. Outlines of Economics. Macmillan.
 Seager, H. R. Introduction to Economics. Holt.
 Seligman, E. R. A. Principles of Economics. Longmans, Green & Co.
 Fisher, Irving. Elementary Principles of Economics. Macmillan.
 Marshall, Alfred. Principles of Economics. Macmillan.
 Taussig, F. W. Principles of Economics. 2 vols. Macmillan.
 Nicholson, J. S. Principles of Political Economy. 3 vols. Macmillan.
 Palgrave. Dictionary of Political Economy. 3 vols. Macmillan.

ENGLISH

A special discussion of various topics for the study of English, combining rhetoric and English literature, is contemplated, and will be issued in a special bulletin in the fall semester.

FRENCH

Schools preparing in French should offer thorough instruction in pronunciation, grammar, and accurate reading.

First Year

Any good grammar, with constant drill on pronunciation, sentence-form, verbs, vocabulary, and idioms; reading of one hundred fifty to two hundred pages of French.

Second Year

Continuation of first year's work, including from three hundred fifty to four hundred pages of reading, mostly modern authors.

Texts may be chosen from the report of the Committee of Twelve of the Modern Language Association of America.

Reference Books

Edgren and Burnet's Dictionary.
Warren's Primer of French Literature.
Duval's Literature (French).
Duruy's Histoire de France.

GEOLOGY

Geology is the application of all the natural sciences in understanding the earth. Accordingly it exercises many faculties, but above all develops the power of observation. Since things geological surround and become a part of the daily experience of every man, a little training in geology is a desirable part of every one's early training. Whether it be rocks, soils, or crops nourished by them, the rain, or any of the many associated conditions,—it is all geological, and every one, no matter what his walk in life is to be, is the better for a little knowledge of the commoner and simpler laws governing such matters. He will at least be able to account rationally for ordinary phenomena.

Geology must necessarily be taught in an elementary way in the secondary schools, but it should not be omitted entirely from the course of study. The best work which the teacher of geology can do is to train the students to notice such universal geological work as the action of the wind, rain, frost, stream, tide, etc. Such work demands no tools or apparatus, entails little loss of time and involves no expense. Send the students into the field, for it is the best laboratory. In making short excursions either alone or accompanied by an instructor, each student should carry a stout knife, garden trowel, or light pick to dig with, and some sort of hammer, preferably a geological hammer. Old newspapers are suitable for wrapping small specimens which are to be taken home. The specimens should be labeled, at least with the place, date, collector, and name of the specimen when learned, and notes should be written out respecting the work done. Students apparently enjoy making columnar sections and plotting on paper the soil, subsoil and rocks as far as it is exposed. All that is needed ordinarily is a start.

In order to encourage and promote an interest in the study of physical geography and elementary geology, the University furnishes, upon application, sets of duplicate specimens to such accredited schools as have suitable cases for them. These sets, to which occasional additions are made, are educational in nature, consisting of minerals, rocks, fossils, etc., and are part of the donations by the Hon. Charles H. Morrill.

A small reference library is essential. As far as possible the books should cover a variety of subjects related to geology and physical geography.

Laboratory practice with rocks and minerals pertains to physical geography as well as to geology. The masses study physical geography; few study geology and mineralogy. Good physical geography is good geology, and a course in this study should form a part of each pupil's training.

The following is a list of a few books which the teacher at least should have at hand:

Geologies

Crosby's Common Minerals and Rocks. A small inexpensive book which each pupil can own and can use in studying and identifying actual specimens of rocks and minerals.

Dana. Revised Text-book of Geology. American Book Co., \$1.40.

Le Conte. Elements of Geology. American Book Co., \$3.50.

Chamberlain and Salisbury. Geology. 4 vols., each \$4. Holt, \$16.

Scott. Introduction to Geology. Macmillan, \$1.90.

Brigham. Text-book of Geology. Appleton, \$1.40.

Tarr. Elementary Geology. Macmillan, \$1.40.

GERMAN

The Status of Modern Language Teaching; Present-Day Ideals.

Of late years the study of German in our high schools has gained so much ground that it seems advisable to state concisely and definitely what should be the aims and objects to be kept in view by both teachers and students of the language. Much thought and investigation have been expended on language teaching by psychologists, teachers, school authorities, and text-book makers. The old-time memoriter methods, conning paradigms, reciting long lists of prepositions, as well as the deadening dictionary translation exercises have largely vanished. Stuff such as was offered to the students of German, even as late as 1875, by the author of a "German Grammar on Mnemonic Principles," is nowadays utterly out of the question. There, e. g., we read (p. 192):

"With **bitten** and **rathen**, **befehlen**, command
The infinitive after an object may stand;
But after to **wish**, **think**, **assert** or to **know**
The infinitive only—no object— can go.

or, again, (p. 195):

"A partitive governs the genitive case,

Or takes **von**, **unter**, **aus**, which must come in its place
With pronouns; as **jeder von Ihnen** of you,
die Meisten von uns, and with numerals too."

It is a far cry from this text-book to those within command of the learner of the present day. Text-book makers vie with each other to present publications adjusted to modern notions of language study. Not that there is not even now a considerable diversity of method and procedure, not that it is immaterial which grammar or what reading text are made the basis of instruction; still, all along the line there is a desire to be abreast with sane and effective educational ideals. The significant feature of all really modern text-books is the stress they place upon the actual, vital, practical use and usages of the language. German is taught to enable the pupil to come into intimate and ready contact with the thoughts and lives, the civilization and culture of the German people. The student has texts treating of the manners, customs, folklore, history, and art of our kinsmen across the sea. Even in the fiction, so abundantly provided by publishing houses, characters, situations and episodes that are peculiarly and characteristically German are most favored.

The Teacher

Today more than at any time previous do school authorities realize that the teacher—the teacher of language as well as those of other subjects—must be a specialist. The teacher must have a fair mastery not only of the subject matter of his specialty, but also of the best and sanest methods of presenting his subject to the learner. To this end the *Lehramtskandidat* must pursue technical courses in the pedagogy of his major subject. Thus every teacher of German owes it to himself and to his pupils to prepare for his calling by taking special courses in phonetics, composition, conversation, and the history of the language. In the teachers' training schools such courses are offered quite generally. The best of these likewise maintain practice schools in which the first efforts of the young teacher can be watched and directed by a sympathetic supervisor of training and experience.

Occasionally young teachers make the financial sacrifice of a considerable stay abroad. This practice is most commendable. In the old world (where such residence abroad is a definite *sine qua non* for teaching the languages) government or city aid is often given to enable a candidate to come into immediate touch with the foreign people by residence among them. We probably cannot do this as yet, and still a very considerable number of the Nebraska teachers of German have spent a year or more in residence abroad.

From what has been said so far about the teacher and his qualifications, it is manifest that only those capable of strenuous application and decided aptitude and devotion to their calling should aspire to be language teachers. The teacher must have faith in his work, must be earnest and enthusiastic in his labors. Enthusiasm is catching; the "Verdenden," as Goethe called the young, are especially susceptible to its influence. Enthusiasm is the fly-wheel that often helps both the teacher and the class past "dead centers." The teacher of German cannot dispense with it. He will utterly refuse to accede to the notion—sometimes encountered—that the cultural and disciplinary value of German, when properly taught, is not equal to that of any other subject in the curriculum.

The Class-room: Special Activities

The German classes should have a room to themselves. This should be provided with a large (Kiepert) map of Germany, with pictures of some of Germany's great soldiers, poets composers, rulers, and scientists. Likewise there should be pictures of German landscapes, cities, "Volksleben." German mottoes on banner or wall also add attractiveness and interest to the surroundings.

Any of the larger schools can maintain a German "Verein," where the beautiful German folk-songs can be practiced, where occasional recitations, short scenes from

larger plays, or (shorter) whole plays can be rendered. This, of course, must be done sparingly, since outside interests are only too apt to cut in upon the student's time and energy. At Christmas a suitable program can be given with all the accessories of the "Weihnachtsbaum."

A few English books on German life and customs, such as Wylie's "The Germans," Mrs. Sidgwick's "Home Life in Germany," Dawson's "German Life in Town and Country," Schauffler's "Romantic Germany," should be on the teacher's desk and within easy reach of every pupil. Larger schools could make an excellent use of a stereopticon or a reflectoscope in order to illustrate German life from lantern-slides or postcards.

The Two-Year German Course

Most of our Nebraska high schools maintain only a two-year course in German; a few favored ones, a three-year course. This limited time is not adequate to reach the most satisfactory results. If the foreign language were begun (as it should be, and as it is done, as a matter of fact, in the old world), in a much lower grade, say, the sixth or seventh, and if it were studied for five or six years, the result would be vastly more valuable. But the time has not yet come in our American schools to stress linguistic studies as is done in the German Realschule and Gymnasium. It is then for us to make the most of our situation. Usually when but two years are given to the German, the pupil has had the advantage of one or even two years of training in Latin. This, in a way, is an advantage, since he is more or less accustomed to grammatical notions and terminology. In another way, however, it is a disadvantage, since with every year of life the child becomes more self-conscious and less free and spontaneous, with imitative faculties less keen, vocal organs less adaptable to new sounds, and verbal memory less tenacious. However, we must adjust ourselves to the actual situation and do what can be done in the best manner possible.

A. The First Year

1. **Pronunciation.** Extraordinary care must be taken to insure a correct and ready pronunciation. This includes not only the proper articulation of single sounds or combinations of sounds, but it must include a fairly fluent and ready natural modulation of the parts of the sentence or paragraph. The monotone often heard in the class-room is distressing. The pupils should be held to read in as natural a tone when reading a foreign tongue as when using their own. Cf. Bagster-Collins' Chapter on Pronunciation in his "German in the Secondary Schools."

The teacher with preliminary phonetic training will have a decided advantage in teaching pronunciation and reading over one who has to rely entirely upon the imitative method. It is worth while to acquaint one's self

with the main principles of the science of phonetics. Even home study is better than no acquaintance with the subject.*

The first few weeks of instruction in German should be carried on purely orally; that is, no books should be put into the learner's hands; above all he should not be required to study pronunciation by himself. Rather should he be trained from the very start to distinguish and to imitate sounds closely, to discriminate between similar sounds, to combine unfamiliar ones, to exercise his vocal organs and modulate his voice, and to become conscious of lip and tongue position in forming different sounds. Considerable time can profitably be put upon these vocal gymnastics. It is best at first not to put the written sign or symbol before the student, since with many, e. g., z.v, w, sp, st, etc., he associates entirely different sounds in his mother tongue. But even when the textbook can no longer be dispensed with, the instructor must not fail to go carefully and repeatedly over every new vocable with the class if he would prevent gross errors and bad habits of pronunciation. "An ounce of prevention is worth a pound of cure."

2. **Systematic Grammar Studies.** The so-called "natural method" has long since proved its short-comings and weaknesses. While as much German should be used in the class-room as can be used profitably, and while systematic grammar should be studied as a means to an end, rather than as an end in itself, experience has proved that only by keeping a firm hold on the life-line of systematic grammar can the student keep afloat upon the turbulent linguistic sea. Without that life-line he is sure to be engulfed as soon as he ventures out of the shallows. Hence great emphasis is to be placed upon a thorough study of the following grammatical categories:

(a) Forms and uses of **haben, sein, werden**. (b) Forms and uses of articles and demonstratives. (c) Case endings of nouns; formation of plurals. (d) Inflections of the adjective and the conditions upon which the inflection depends. (e) Forms and conjugation of "weak" and "strong" verbs. (f) Meanings, forms and uses of modal auxiliaries. (g) The more common prepositions and the cases governed by them. (h) The "kennen" type of verbs.

* The following books on phonetics are simple and yet thoroughly scientific:

Vietor's German Pronunciation. Carl Schoenhor, Boston (\$.80).

Vietor-Rippmann's Elements of Phonetics, English, French and German. Dent (\$1.00).

Grandgent's German and English Sounds. Ginn & Co. (\$.50).

Hempl's German Orthography and Phonology. Ginn & Co., Boston.

(i) Pronouns as to form and function. (j) The main principles of tense formation. (k) Forms and more obvious meanings and uses of the subjunctive mood. (l) Formation and use of the passive voice; equivalents of the same, e. g., *man sagt*. (m) Fundamental characteristics of the various sentence-orders (to be stressed from the beginning. (n) A good working vocabulary.*

A mere glance at the above enumeration shows that the learner must master an exceedingly large field, so large indeed that he cannot do it in two semesters. If these subjects are taught in a live, sane, interesting way, and if the material is made to yield its contents fully and connectedly, the student is not likely to chafe under its systematic presentation, no matter how much time is required. **Forms and paradigms must be mastered.** But forms and paradigms should be applied, their utility being made to appear in their application and use. Happily most modern grammars recognize this principle thoroughly. Instead of the disconnected illustrative sentence, modern pedagogy insists upon using forms, paradigms and construction in as connected a way as possible.

Under certain conditions it is well to commence reading simple, connected texts as early as the second semester. For example, the first pages of "Gluck auf" are thoroughly within reach of pupils of that advancement. Some parts of "Im Vaterland" could be so used. But whether the class take up a special reading text or not, the student should get a firm and vital grip upon form and contents of the language-material with which he deals.

The importance of a good working vocabulary is ordinarily not appreciated sufficiently. To learn and acquire a vocabulary, to make the foreign words and phrases a part of one's consciousness is of the utmost importance to progress. To have a large vocabulary is comparable to having money in a bank. It can be drawn on, it is

*Among the grammars more particularly adapted to high school use the following seem to have tested out well:

Bacon's German Grammar. Allyn and Bacon, Chicago.

Vos' Essentials of German. Henry Holt & Co., New York.

Becker and Rhoades' German Grammar. Scott, Foresman.

Keyser and Montesper's Brief German Course. Am. Book Co., Chicago.

Spanhoofd's Lehrbuch der deutschen Sprache. Heath.

Fraser and Van der Smissen's German Grammar. Tho a most excellent book, it is perhaps too difficult for the average high-school class. It should be on the teacher's desk for consultation. Heath.

Bagster-Collins' First Book in German. Macmillan.

ready for use. It may be suggested that the teacher can be of great aid to the student in making himself master of a large working vocabulary. He can do this by requiring pupils to look for associated forms and ideas, e. g., to link noun and verb forms, to connect countless derivative groups, to master and fix groups like: Vater, Mutter; Bruder, Schwester; Stadt, Land; alt, neu; nasz, trocken; hoch, niedrig; Stunde, Tag, Nacht, Woche, Monat, Jahr; etc. Again, types such as Fall, fallen; Schusz, schieszen; Gang, gehen; or kurz, Kürze; schwach, Schwäche; kalt, Kälte; and many other associational groupings can be made to serve the memory. But when all is said and done there must be a great deal of honest, persistent, hard application of memory-work to the task in hand. The ready command of a vocabulary is worth all its costs.

The English-German exercises found in all our grammars, even those written in the spirit of the reformers, are a necessary evil. Theoretically, it would seem a pedagogical blunder to require the learner to change from one language to another, instead of immersing him in the foreign idiom. But aside from the fact that to do this is exceedingly difficult, it is questionable whether, even if it could be done, it would be an equally effective means of checking up the student's work. An oral working over of the English-German exercise should precede written work, especially in the first few months of study. To reverse this process is to give the student the most favorable opportunity to impress upon his mind serious defects in form and substance. "Red-ink" teaching has ever been and ever will be nerve-racking and inefficacious.

B. The Second Year

Grammar, Reading, Composition

1. **General Considerations as to Objects and Methods.** it is true that "Die Lektüre steht im Mittelpunkt des heusprachlichen Unterrichts"—"Reading is the central feature of modern language instruction." However, this dictum of educational authorities is to be understood quite differently from what is too often done. It is not a mere turning of a certain number of lines of good German into halting, more or less faulty English. It means that the reading lesson is to be made the occasion for bringing out specific points of matter and form and that it affords a laboratory period in which the teacher presents to the class an interesting bit of narration, description, poem, characterization, or anecdote in a connected, natural, and suggestive way. Grammar studies begun in the previous year must be continued. For example, the many intricate questions relating to the subjunctive, the modal auxiliaries, impersonal, reflexive, and separable verbs, the word-order, the more obvious principles of word-derivation,—all should receive the most careful and systematic attention. This can be done only by setting aside definite class periods for grammar studies. It is only thus that the "kennen" is transformed into a "können."

2. **Reading proper: Translation.** If all our German teachers were experts, if all commanded the language as they do their English, and if more time were available, a large part of the translation feature of teaching might be dispensed with. As it is, much of the material must be translated. As more difficult texts are taken up, or as more difficult passages occur in the simpler texts, translating becomes well nigh indispensable. Two considerations may well guide the teacher and pupil along the safe path: (1) Never translate when it is possible to get along without it. To require a child to say: "Dis ist mein Vater." "This is my father," is nonsense and is deadening to both teacher and taught. (2) Translate a word, phrase, sentence, paragraph, only when there is a valid reason for thinking that clearness demands it. Translation should be simply a method of testing and controlling the student's work, and should be resorted to only when absolutely necessary to master the material. Experience teaches that we should not dispense with it. The most a competent teacher can do is to minimize its use. (Cf. Bagster-Collins, "German in Secondary Schools," Chapters 8 and 9.)

One other practical consideration is the order of procedure. Shall there be translation first, and reading the German afterwards, or the reverse? One in sympathy with this report will have no difficulty in agreeing to the proposition that the final step should be the reading of the German—i. e., taking in the original and lodging it in the pupil's consciousness. This reading and translating should not be sentence for sentence, or passage for passage, but rather paragraph for paragraph, or even page for page. Reading in concert is at times advisable, tho ordinarily the teacher can correct faulty pronunciation and voice modulation better by working with the individual.

3. **Some Suggested Texts; Amount to be Read.** There is at present a large number of available texts for second-year reading. Among these are: Bacon's "Im Vaterland," Allen's "Herein," Baumbach's "Der Schwiegersohn," Wildenbruch's "Das edle Blut," Gertäcker's "Germelshausen," Blüthgen's "Das Peterle von Nürnberg," Seidel's "Leberecht Hühnchen," Schrakamp's "Ernstes und Heiteres," Hauff's "Das Kalte Herz," Storm's "In St. Jürgen," Mosher's "Willkommen in Deutschland," Hillern's "Höher als die Kirche," Benedix's "Der Prozess" (comedy), and Moser's "Köpnicker Strasse No. 120" (Lustspiel). From these texts, or others of the same grade, the teacher should make a selection of some 150 to 200 pages which, together with the grammar studies necessarily left unfinished in the first year, should constitute the substance of the second year's work. The teacher may well select those with which he is most familiar, those which in substance and form appeal most to his taste, and which he can handle with greater freedom and directness. The material should be distinctly and characteristically German in form and spirit. There should be no attempt at studying literature the second year.

C. The Third Year

The work in the third year should incidentally review and apply the work of the first two years. To this end frequent composition exercises, based upon the text read, should be a vital part of the course. Ground that has once been gained should never be given up. Incidentally the bearing of German on English grammar or usage may occasionally be brought home to the student. The study of German, while in and of itself important enough to be a part of the school curriculum, finds additional justification in the illuminating sidelight which it throws upon the structure and characteristics of the English tongue. Nevertheless, the teacher of German must not go too far afield to teach English grammar. His own domain is quite vast enough to demand his attention.

The outcome of the third-year study of the language should be the acquisition of enough power and familiarity with average textual and grammatical peculiarities to make the understanding of moderately difficult German a possible undertaking. The texts read and studied should put the student in touch with German thought and life, with German traditions and ideals. They should afford glimpses of the Fatherland and its people, their characteristics and civilization. If possible, the student should get a little taste of the German literature and have his finer sensibilities quickened and his appreciation of the worthy and beautiful cultivated.

Among others the following texts may be suggested as providing suitable third-year reading material: Thiergen's "Am deutschen Herd," Riehl's "Burg Neideck," Niese's "Aus dänischer Zeit," Ebner-Eschenbach's "Die Freiherren von Gemperlein," Rosegger's "Waldheimat," Freytag's "Die Journalisten," Hatfield's "Lyrics and Ballads," Schiller's "Tell" or "Jungfrau von Orleans," Meyer-Foerster's "Karl Heinrich," and Suderman's "Frau Sorge" (novel).

The average third-year class, in addition to the grammar review and composition work, should be able to work over some 300 to 350 pages of suitable texts. Narrative prose should predominate.

Professional Helps for the Teacher

1. Bagster-Collins' German in Secondary Schools. The Columbia University Press, New York. (An excellent volume.)
2. Bahlsen's Methods of Teaching Foreign Languages. Ginn.
3. Report of the Committee of Twelve of the Modern Language Association of America. Heath.
4. Breul's Teaching of Modern Foreign Languages in Our Secondary Schools. Cambridge, England. (A most helpful, practical manual.)
5. Duden's "Orthographisches Wörterbuch der deutschen Sprache." (Indispensable for all the little details of recent German spelling reforms.)

6. Vietor's "Deutsche Lauttafel." (Any German book-seller.)
7. Vietor's "Phonetik"—a remarkably clear and "gemein-verständliche" presentation of the subject of phonetics; thoroughly practical and helpful. (Any German book-seller.)
8. "Pädagogische Monatshefte, Zeitschrift, für das deutsch-amerikanische Schulwesen," Milwaukee. (Monthly excepting July and August. Very suggestive.)
9. Flügel-Schmidt-Tanger's German-English and English-German dictionary. German-English part excellent, English-German not so good. (Both, \$4; separately, \$2.)
10. Heyne's "Deutsches Wörterbuch," Kleine Ausgabe (\$3.25). One of the very best all-German dictionaries.
11. Hölzel's Wandbilder. Nos. 1, 2, 3, 4 (Die Jahreszeiten), No. 5 (Der Bauernhof), and No. 8 (Die Stadt), are the best. Excellent colored wall pictures, large, mounted on rollers, \$1.75 each. A good guide for the teacher to use these wall pictures for conversational purposes is Seelig, "Methodischgeordnetes Englisches Vokabularium zu den Hölzelschen Wandbildern." (20c, Bromberg, 1899.)
12. Weise's "Unsere Muttersprache, ihr Werden und Wesen." 65c. Scholarly and yet popular.

Information concerning German books, pictures, lantern slides, or maps may be had of G. E. Stechert, 151-155 West Twenty-fifth street, New York City; Lemcke & Buechner, New York City; George Brumder, Germania Building, Milwaukee; or Kölling & Klappenbach, Chicago. The German department of the University is anxious to be of direct assistance to the schools and German teachers of this state. Address Professor Laurence Fossler, University of Nebraska, Lincoln.

GREEK

The following course of study is recommended for schools that are able to give one, two, or three years to the study of Greek. The course is based upon five recitation periods weekly throughout the school year.

First Year

First Semester—Elementary lessons; inflection of nouns; conjugation of regular verbs; mastery of a vocabulary of 400 to 500 words; reading of easy selections.

Second Semester—Elementary lessons finished; conjugation of irregular verbs; Xenophon's *Anabasis*, fifteen to twenty-five pages, or an equivalent amount of other easy prose narrative; daily practice in reading aloud and in writing Greek.

Special attention should be given during the first year to the noun and verb forms and the more elementary principles of syntax.

Second Year

First Semester—Xenophon's *Anabasis*. Books I and II. Thorough review of noun and verb forms; studies in syntax; principles of word formation. Daily practice in reading aloud and in writing Greek.

Second Semester—Xenophon's *Anabasis* (continued), Books III and IV, or other Attic prose, sixty to seventy-five pages; systematic study of the grammar; practice in reading aloud and in translating at sight. Greek prose composition, based upon Books I and II of the *Anabasis*, or the completion of twenty-five to thirty lessons of some standard Greek composition manual.

Third Year

First Semester—Homer's *Iliad*, Books I, II, III (omitting Book II, 494—end). Special attention should be given to epic forms and constructions; the dactylic hexameter carefully studied; constant drill in scansion.

Second Semester—Homer, 1,800 to 2,000 lines which may be selected from the *Iliad* or the *Odyssey*. A systematic study of the epic dialect and syntax. Constant practice in reading the dactylic hexameter with intelligent expression.

A thorough and methodical study of Greek grammar is necessary as a basis for accurate and intelligent reading. There should be systematic instruction in Greek prose composition during the first and second years. Constant practice in reading aloud is strongly recommended, since this aids greatly in the treatment of Greek as a living language. Practice in the reading of unprepared passages (sight translation) is recommended during the second and third years. This enables the teacher to discern the difficulties which the student may have in translating a new sentence, and gives the student readiness and confidence in the language. Rapid reading should be judiciously combined with exact translation and with constant practice in writing Greek.

Students who may not have been able to secure Greek in the high school can begin the study of the language at the University. Those who have had even a minimum amount can continue the study from any point they may have reached in the high school. In either case full college credit is given for the elementary Greek carried at the University, if the student has the necessary number of entrance credits in other subjects.

Reference Books

- Collins, W. L. (editor). *Ancient Classics for English Readers*. Homer's *Iliad*. Homer's *Odyssey*. Xenophon. Lippincott. Each vol. 50 cents.
- Arnold, M. *On Translating Homer*. In Vol. II of complete works. Macmillan, \$1.50.
- Gayley, C. M. *Classic Myths in English Literature*. Second Edition. Ginn, \$1.65.
- Gulick, C. B. *Life of ancient Greeks with special reference to Athens*. Appleton, \$1.40.

- Jebb, R. C. Homer. Introduction to the Iliad and the Odyssey. Ginn, \$1.25. Contains chapters on general literary characteristics, the Homeric world, Homer in antiquity, and the Homeric question.
- Seymour, T. D. Introduction to the Language and Verse of Homer. Ginn, 80 cents.

HISTORY—AMERICAN

Place and Time.—The recognized place of American history in practically all of the best four-year high schools of the state is in the twelfth grade. A one-semester course can be given, but is not recommended. Where American history and civics are combined in one course, at least two semesters of daily recitations should be given to the course.

Teacher.—To be effectively taught, history demands just as highly specialized and thoroughly prepared teachers as do the other subjects of the curriculum. No teacher of history should be expected to carry more branches or hours than does the teacher of any other specialized high-school subject. Profitable work in history depends more upon a competent, well-prepared teacher than upon any other one factor. The idea that "anyone can teach history" is responsible for a large share of the poor results obtained from history work in some of our schools. History is one of the most practicable and valuable of present secondary subjects for training future citizens; but much of this value is being lost through the work of unprepared and unqualified teachers.

Equipment.—Modern history teaching demands more than a textbook. In addition to one of the standard textbooks, each pupil should each day consult at least one library or reference book. On the following pages are suggested desirable books for such use. Besides these, each school should possess at least one good set of historical wall-maps or wall-charts. In a school just beginning work in history, the use of geographical or present-day maps may be excused; but no school pretending to be up-to-date in its history teaching will long be without an equipment of historical maps (see list). Pictures and other illustrative material may be made profitable use of by a properly prepared teacher; but in the hands of unskilled teachers such material is apt to be used to little purpose or profit.

Method.—The most generally used method of history teaching today by progressive teachers is some form of the library or topical method. An outline or text furnishes the assignment and reading references for each day's work of the class. Preparation for recitation consists in the study of the text and supplementary reading in as many reference books as the remaining preparation time permits. Notes on readings may be required; but if the teacher is thoroughly in control of the subject matter of her reference books, the class recitation may be used for

checking up on the readings as well as for covering the day's lesson. Recitation ordinarily consists of oral questions, intelligently designed to bring out the main trend of the day's assignment, its relation to preceding lessons, its most important details, and the varying interpretations and judgments found in the different authorities. When especially good subject matter offers, intensive secondary or source studies may profitably be made, and will help to relieve the monotony of any one method of carrying on the recitation. At appropriate points, the making of maps may be assigned as part or all of the preparation for a given day, and the recitation devoted to explanation and criticism of the map.

Reviews.—One of the most valuable results of history work will be lost to the teacher who slights periodic reviews. Such reviews should not be automatically set, but should be made whenever a distinct period or movement, covered in several days or weeks of class work, has been finished. Review questions should not be for the purpose of bringing out details, but for showing development and relationships. Not only should the movement within each period be clearly brought out; but also each period should be clearly connected with the ones that have preceded it. Understanding is the greatest of all aids to memory. If the pupil really understands any period the facts of that period will be remembered without particular effort. Even where the main object of the course is preparing for the county or state examinations, this will be found one of the most profitable methods of study.

Professional (For the Teacher)

"The Study of History in Secondary Schools" (Report of American Historical Association "Committee of Five"; supplementary to the Report of the "Committee of Seven" in 1899.) Macmillan, 1911. 25 cents.

"The History Teacher's Magazine" (Edited under the supervision of a committee of the American Historical Association). McKinley Publishing Co., 1619 Ranstead St., Philadelphia, Pa. \$2.00 a year (10 numbers). \$1.00 a year to members of the Nebraska History Teachers' Association, if subscription is sent through the secretary of the Association.

Student's American History Outlines

New England History Teachers' Association's "Outline of American History" (Heath, 15 cents).

Persinger's "Student's Outline of American History, 1492-1910" (University Publishing Co., Lincoln, 25 cents).

"McKinley's Illustrated Historical Topics for American History," combining syllabus, map, pictures, and source material in one notebook (McKinley Publishing Co., 2 cents a topic or 30 selected topics for 50 cents).

Standard Text-books

- Channing, *Students' History*, revision of 1908 (Macmillan, \$1.40).
 James and Sanford, *American History* (Scribner, 1909, \$1.40).
 West, *American Democracy* (Allyn & Bacon, Boston, 1912, about \$2).
 Ashley, *American History* (Macmillan, 1908, \$1.40).
 Hart, *Essentials of American History* (Am. Book Co., 1905, \$1.50).
 McLaughlin, *Making of the American Nation* (Appleton, 1899, \$1.40).
 McMaster, *School History* (Am. Book Co., 1897, \$1).
 Muzzey, *American History* (Ginn, revised edition, 1912).
 Adams and Trent, *History of the United States* (Allyn & Bacon, 1903, \$1.50).
 Montgomery, *American History* (Ginn, 1905, \$1).

Library Reference Books

For the smaller or beginning library, the larger "general histories" (such as Schouler or McMaster) represent so small an amount of really usable material at so great a cost that their purchase is not advised. Instead are recommended the shorter works, standing about half way between the text-book and the "general history." The list below is for a class of not more than six or seven students. For each additional six or seven members of a class it is urged that **this list be duplicated**, rather than new authors added. This will permit of ample variety for the individual student, and yet not scatter reading over so large a number of books that the teacher will be unable to retain a mastery of them for class quizzing. List for a class of six or seven:

At least **two** of the textbooks already listed, in addition to the text-book already in the hands of each member of the class.

Elson's "United States" (1 vol. edition, Macmillan, \$1.75).

Either the "Epoch" series (Thwaite's "Colonies," Hart's "Formation of the Union," Wilson's "Division and Reunion," Longmans, \$1 a vol.), or Smith's "Thirteen Colonies" and Sparks' "United States" (2 vols. each).

Sparks' "Men Who Made the Nation," (Macmillan, \$1).

Any one of the following—Caldwell and Persinger's "Source History" (Ainsworth, \$1.25); James and Mann's "Readings in American History" (Ginn, \$1.80); Harding's "Select Orations" (Macmillan, \$1.25); MacDonald's "Documentary Source Book" (Macmillan, \$1.75); West's "Source Book of American History" (Allyn & Bacon, 1912, about \$2).

Haworth's "Reconstruction and Union, 1865-1912" (Holt & Co., 50 cents).

Larger Additional Reference Works

Frequent requests have been received for lists of groups of books that may be added to high-school libraries from year to year, as funds accumulate and teachers gain control of existing equipment. The following are suggested, in the order in which they may be added most profitably to the average library:

Group 1. Fisher's "Colonial Era" (Scribner, \$1); Sloane's "French War and Revolution" (Scribner, \$1); Woodburn-Lecky's "American Revolution" (Appleton, \$1); Fiske's "Critical Period" (Houghton, Mifflin & Co., \$1.50); Walker's "Making of the Nation" (Scribner, \$1); Burgess' "Middle Period" (Scribner, \$1); Paxson's "Civil War" (Holt, 50c); Peck's "Twenty Years of the Republic" (Dodd, Mead & Co., \$2.50); Hart's "Contemporaries" (4 vols., Macmillan, \$1.50 a vol.), or Woodburn-Johnston's "American Orations" (3 vols., Putnam, \$1 a vol.).

Group 2. Coman's "Industrial History of the United States" (Macmillan, \$1.25); Dewey's "Financial History of the United States" (Longmans, \$2.50); Woodburn's "Political Parties and Party Problems" (Putnam, \$2), or Macy's "Party Organization and Machinery" (Century Co., \$1.25); Stanwood's "History of the Presidency" (Houghton, Mifflin & Co., \$2.50), or McClure's "Our Presidents" (Harper, \$2).

Group 3. Any one of the following: Channing's U. S., 1000-1877 (8 vols., 3 out, Macmillan, \$2.50 a vol.); Schouler's U. S., 1784-1865 (6 vols., Dodd, Mead & Co., \$13.50); McMaster's Amer. People, 1784-1877 (8 vols., Appleton, \$2.50 a vol.); Wilson's Amer. People, 1492-1900 (5 vols., Harper, \$17.50).

Group 4. The following biographies from the "American Statesmen" series (Houghton, Mifflin & Co., \$— a vol.): Washington, Jefferson, Hamilton, Jackson, Clay, Webster, Calhoun, Lincoln, Sumner.

Group 5. Any one of the following: The "American Nation" series (25 to 27 vols., Harper, \$1.50 a vol.); Rhodes' U. S., 1850-1877 (7 vols., Macmillan, \$2.50 a vol.); Henry Adams' U. S., 1800-1817 (9 vols., Scribner, \$18).

Colored Wall Maps or Charts

Foster's Illustrative American Historical Chart (32 plates, 29 x 36 inches; Rand, McNally & Co., \$20); American Historical Map Set (16 maps, 40 x 45 inches, Atkinson, Mentzer & Grover, Chicago, \$20); Crane's American Historical Chart (Crane Publishing Co., Topeka, Kas., write for catalogue); MacCoun's Historical Chart (26 maps, 38 x 40 inches, Silver, Burdette & Co., Chicago, \$15).

Outline Wall Maps

(These are maps with only physical features and state boundaries filled in. The historical features are to be made and colored on maps by the teacher.)

McKinley Outline Wall Maps (32 x 44 inches, manila paper, 20c each, postage 10c; \$15 per 100; all countries. McKinley Publishing Co., 1619 Ranstead St., Philadelphia).

Outline Base Map of the United States (20 x 30 inches, white paper, physical features and state boundaries, 10c each, prepaid, or \$6 per 100; U. S. Geological Survey, Washington, D. C.).

Outline Desk or Student Maps.

Outline Tracing Maps (14 x 21 inches, 5c each, or \$3 per 100. Rand, McNally & Co.).

(Containing only physical features and state boundaries. To be filled in and colored by students as part of preparatory work for class when map work is assigned.)

McKinley Outline Desk Maps (5 x 7 inches, 35c per 100; 7 x 10 inches, 50c per 100; all countries; also in sets and "atlas" form; McKinley Publishing Co., 1619 Ransstead St., Philadelphia). "Talisman" Historical Outline Maps (8 x 10 inches, \$1 per 100; all countries; also in sets and "atlas" form; Atkinson, Mentzer & Grover, Chicago). Progressive Outline Maps (8 x 9, 10 x 12, \$1.75 per 100; all countries; Heath). Outline Map U. S. (11 x 18 inches, \$1.50 per 100; Heath). New Century Development Maps (36 cents per block of 50, all countries; Silver, Burdette & Co., Chicago). Harrison Outline Maps (7 x 8½ inches, 45 cents per 100; 8½ x 11 inches 60 cents per 100; 11 x 13 inches, 90 cents per 100; all countries; Nystrom & Co., 28 W. Lake St., Chicago). Lincoln Geographical Series (8½ x 10 inches, \$1 per 100, all countries; Atkinson, Mentzer & Grover, Chicago). Foster's Historical Outline Maps (40-map set, 30c; special colored set for teacher's use, \$1).

Coloring Materials for Map Making

Diamond Dyes (any color, prepared according to directions); colored inks (red, blue and green, at 5c to 10c a bottle; brown and yellow India inks at 25c a bottle); water colors (small sets, 10c to 30c, for use of students; larger sets or quantities for wall maps). Water-color brushes for class maps; small flat paint-brushes for wall maps. In making wall maps, going over colors a second time will improve evenness of distribution.

HISTORY—EUROPEAN

Course of Study.—The four-year course in history, generally recommended by the history teachers' associations of the country, consists of one year of Greek and Roman history, one year of medieval and modern history, one year of English history, and one year of American history, arranged in the above order. Where less than four years are devoted to history, it is well to arrange the work so that it can be developed into the approved course. For instance, if but one year is given, let it be Greek and Roman history; if but two years, add a year of English history; for a third year, bring in American history, and for the fourth, medieval and modern. The old one-year course in general history does not meet with the approval of good history teachers anywhere.

Material.—A good narrative text and some source material form the indispensable equipment of the class. For-

tunately the market is well supplied with good narratives. For Greek and Roman history any of the following are satisfactory: Botsford, Myers, Morey, Sheldon, West, Wolfson. (For the full title of these works and for collateral material, consisting of sources and secondary works, see "A History Syllabus for Secondary Schools" [Heath & Co., Boston, 1904, \$1.20]. This work is the publication of the New England History Teachers' Association and should be in the private library and on the desk of every teacher of history. It contains suggestions on the teaching of history; list of books for libraries, with prices; outlines with exact references for pupils, and other helpful material.) Some collateral reading should be done in the sources and sufficient time given to them in the class so that the pupil will have at least a faint idea of what evidence means. (For the list of source-material suitable for such work, see "Historical Sources in the Schools" [Macmillan, 1902, 50 cents]. This work was prepared by the New England History Teachers' Association.)

Methods.—Methods are determined by the ends aimed at, of which there should be at least two—a knowledge of the historical development and of the process by which we get at historical truth. The period studied should be treated as a whole. Each new topic should be bound to all the preceding topics by oral and written review—outlines and narratives, with a few dates—and when the work of the semester is finished, the pupil should be able to give a rapid survey of the whole subject. The advance work should be studied by means of questions set upon the material, calling for written answers and class-room discussion. When the study of the topic is complete, the results should be presented in outline form and this, at times, should be followed by a narrative. In the supplementary reading, the pupil should be taught to read a paragraph or a page and to write down in clear English the substance of what has been read. The second end can be attained by frequent questions upon the sources of information—meaning by that real sources, not modern writers: Herodotus, Thucydides, Plutarch, etc., and not Botsford, West, Myers or Wolfson—that the pupil may learn what they are, what they are worth, and how unreliable much of our so-called history is. Historical geography should receive constant attention, and much interest can be aroused by the use of the Perry pictures of Greek and Roman buildings and statuary.

At the end of a year's work in history a pupil should have a clear outline of the period covered. He should have a working knowledge of the principal sources of information, of how to make an outline, of how to read a book and give the substance of what he has read in good English, and last, of how to study two successive historical maps and explain the changes that have taken place. Every pupil should know these things, whether he is to go to the University or not. If he does not know them when he enters the University he is handicapped in his work.

LATIN

In teaching Latin syntax it has been the custom not to differentiate sufficiently between constructions occurring often and those that are rarely found in the early readings. The result is that the work has been so overcrowded that it cannot be done thoroly. It would be better to emphasize the often occurring constructions at first and leave the rare ones to be mastered later. As a help in this direction the differentiation below is offered.

First Year

Elementary Lessons. A thoro mastery of forms and vocabularies. Connected readings from an easy text should be introduced during the last third of the year. The following constructions should be thoroly studied:

I. Nouns. 1. The Nominative; 2. Genitive, (1) Possessive, (2) Objective, (3) Partitive, (4) Material; 3. Dative, (1) Indirect Object, (2) Special Verbs, (3) with Compounds, (4) Reference, (5) Purpose; 4. Accusative, (1) Direct Object, (2) Limit, (3) Subject of Infinitive, (4) with Prepositions; 5. Ablative, (1) Separation, (2) Agent, (3) Means, (4) Cause, (5) Manner, (6) Accompaniment, (7) Specification, (8) Absolute, (9) Place, (10) Time, (11) with Prepositions.

II. Verbs. 1. Tenses—Regular Sequence; 2. Independent Clauses—the Indicative; 3. Substantive Clauses, (1) *quod* Ind, (2) Volitive, (3) Indirect Questions; 4. Relative Clauses—Indicative; 5. Adverbial Clauses, (1) Indicative, (2) Purpose, (3) Result, (4) Time—*cum*, (5) Cause—*quod*, (6) Subordinate Clauses in Indirect Discourse; 6. Infinitive, (1) Subject, (2) Complementary, (3) Object, (4) in Indirect Discourse; 7. Participle, (1) Perfect, (2) Gerundive, (3) Passive Periphrastic; 8. The Gerund.

Second Year

Caesar, four books. Prose composition from a text book, one period per week during the entire year; or Caesar, two books and fifty pages of miscellaneous reading—*Nepos* and *Viri Romae* preferred—with prose composition as above. The forms should be reviewed the first half of the year and the above constructions mastered. Definite work in vocabularies and sight reading. The following additional construction should be mastered:

I. Nouns. 1. Genitive, (1) Quality, (2) With Adjectives; 2. Dative, (1) Agent, (2) Possessor, (3) With Adjectives; 3. Accusative, (1) Adverbial, (2) Time and Space; 4. Ablative, (1) Source, (2) With *Utor*, etc., (3) Difference, (4) Quality.

II. Verbs. 1. Independent Clauses, (1) Subjunctive for Imperative in Indirect Discourse, (2) Subjunctive for Interrogative in Indirect Discourse; 2. Substantive Clauses, (1) *Quin*, etc., (2) of Fear, (3) Result; 3. Relative Clauses, (1) Purpose, (2) Characteristic; 4. Adverbial Clauses, (1) Time—*Antequam*, etc.; *dum*, etc.; *postquam*, etc., (2) Cause—*cum*, (3) Concession—*cum*, *etsi*, etc., (4) Attraction; 5. Infinitive, (1) Apposition, (2) With Adjectives, (3) Historical; 6. Participle—Present; 7. Supine in—*um*.

In case a construction occurs in the text not given above, the teacher should give an oral explanation of it, in order that the pupil may get the thought. It would be well, near the close of the year, to have the class write papers on the Life and Times of Caesar. The teachers should furnish an outline and suggest such helps as the pupils may need to enable them to work intelligently.

Third Year

Cicero. Six orations. It is most desirable that only two of the Catilines be read and that the Defense of Archias be taken last. The Manilian Law is a good one to begin with. Substitution of Cicero's letters to the equivalent of one oration is recommended. Definite work in vocabularies and sight reading. The following additional constructions should be mastered:

I. Nouns. 1. Vocative; 2. Accusative, (1) Two Accusatives—of Making, etc., (2) Exclamation; 3. Ablative—Comparison.

II. Verbs. 1. Tenses—Irregular Sequence; 2. Imperative; 3. Independent Clauses—Subjunctive, (1) Volitive, (2) Potential, (3) Concessive; 4. Relative Clauses, (1) Result, (2) Cause; 5. Adverbial Clauses, (1) Proviso, (2) Concessive—*quamquam*, (3) Conditional Clauses—the three types; 6. Participle—Active Periphrastic; 7. Indirect Discourse. Papers should be prepared on the Life and Times of Cicero on the same plan as in Caesar.

Fourth Year

Vergil's Aeneid. Six books. An equivalent of two books may be read from Ovid, but book VI of the Aeneid should not be omitted. A thoro drill in prosody and poetic idioms. The student should acquire the ability to read metrically Latin hexameters at sight. Figures of speech should be studied and lists of passages made illustrating the different figures. The pupils should early be made familiar with the story of the Trojan war and the mythological characters connected with it. A polished English translation should always be required on each day's review lesson. Occasionally metrical translations should be encouraged. Definite work in vocabularies and sight reading. The following constructions should be mastered:

I. Nouns. 1. Genitive, (1) Remembering, etc., (2) *Miseret*, etc.; 2. Dative—Direction, etc.; 3. Accusative, (1) Cognate, (2) Synecdochical.

II. Verbs. 1. Independent Clauses, (1) *Ne* and imperative, (2) Subjunctive—Volitive, Optative, Obligation; 2.

Adverbial Clauses—Comparison; 3. Infinitive—Purpose, etc.; 4. Participle—Future; 5. Supine in—U. There should be a definite review each year of forms, and of the constructions learned the preceding year.

Throughout the second, third and fourth years the finest passages should be written out in the best English possible. Schools whose Latin courses are less than four years should complete an author as far as they go and not read a part of each.

The Roman pronunciation should be used. Great care should be taken to train the students in accurate and ready pronunciation, which will help them to appreciate the dignity and earnestness of the Roman character. For a pupil to study the Latin without discovering its stateliness is to lose an important element of it.

The purpose of prose composition is to give students a ready knowledge of the forms and constructions. They are often lamentably deficient in these. Many times they give a so-called translation that is a mere assemblage of words with no meaning. They should be led to understand that they are dealing with the thought of the author and that a translation that does not express his thought is no translation. One cannot get an author's meaning without a knowledge of the construction he uses. These are his means of expressing thought just as much as the words he uses are. After a pupil has read a passage in class and translated it, he should be questioned on the construction of every word which he is liable not to understand. The composition should be interspersed throughout the reading of Caesar and Cicero and under no circumstances should it be left to be done after the class is through with those authors. It should be made a help to the reading. In all written exercises the long vowels should be marked.

The ultimate aim of the study should be an ability to translate accurately, to construe all ordinary passages, a broadening of the knowledge of English words by a constant reference to words derived from the Latin, and an ability to hold many details in the mind at the same time and to do enough original thinking to divine the author's thought and turn it into the best English.

Reference Books

Harper. Dictionary of Classical Literature and Antiquities; edited by H. T. Peck. Am. Book Co., \$6. Valuable also for students in ancient history and in English literature.

Leighton. History of Rome. \$1.20.

Abbott. Roman Political Institutions. Ginn. \$1.50.

Judson. Caesar's Army. Ginn. \$1.

Munro. Source Book of Roman History. Heath. \$1. Either this or Botsford's source book should be in every school.

Prescott and Dodge. Private Life of the Romans. Sanborn. \$1.

- Greenidge. Roman Public Life. Macmillan. \$2.50.
- Johnston. Private Life of the Romans. Scott, Foresman & Co. \$1.50.
- Abbott. Short History of Rome. Scott, Foresman & Co. 80 cents.
- Granrud. Roman Constitutional History. Heath. \$1.
- Gayley. The Classic Myths in English Literature. Ginn, \$1.50.
- Harrington and Tolman. Greek and Roman Mythology. Sanborn. \$1.
- Fairbanks. Mythology of Greece and Rome. Appleton. \$1.50. The latest on this subject.
- Guerber. Myths of Greece and Rome. Am. Book Co. \$1.50.
- Gow. Companion to School Classics. Macmillan. \$1.75.
- Platner. Topography and Monuments of Ancient Rome. Allyn & Bacon. \$3.
- Lanciani. Ruins and Excavations of Ancient Rome. Houghton, Mifflin & Co. \$4.50.
- Sanborn. Classical Atlas. Sanborn. \$1.
- Kirtland. Fabulae Faciles. Longmans. \$1.
- Holmes. Caesar's Conquest of Gaul. Macmillan. \$6.50.
- Boissier. Cicero and His Friends; translated by A. D. Jones. Putnam. \$1.75.
- Glover. Studies in Vergil.
- Harding. City of Seven Hills. Scott, Foresman & Co.
- Macaulay. Lays of Ancient Rome.
- Guhl and Koner. Life of the Greeks and Romans. Appleton. \$2.50.
- Church. Roman Life in the Days of Cicero. Dodd. 75 cents.
- Forsyth. Life of Cicero. Scribner. \$2.50.
- Fowler. History of Roman Literature. Appleton. \$1.40.
- C. Morris. Historical Tales: Roman. Lippincott. \$1.
- Fowler. Julius Caesar. Putnam. \$1.50.
- Inge. Society in Rome Under the Caesars. Scribner. \$1.25.
- Huelsen. The Roman Forum; translated by J. B. Carter. G. E. Stechert & Co. \$1.75.
- Mau and Kelsey. Pompeii, Its Life and Art. Macmillan. (Abridged edition.) \$2.
- Plutarch's Lives; translated by Clough. Little. \$2.
- Ferrero, Guglielmo. The Greatness and Decline of Rome. 2 vols. Putnam.
- Ferrero, Guglielmo. Characters and Events of Roman History. Putnam.
- Fowler, W. W. Social Life at Rome in the Age of Cicero. Macmillan.
- Abbott, F. F. Society and Politics in Ancient Rome. Scribner.
- Lodge, Gonzales. Vocabulary of High School Latin. Columbia University, New York.
- Byrne, Lee. Syntax of High School Latin. University of Chicago Press.
- Herberman, C. G. Business Life in Ancient Rome. Harpers, New York.
- Card Games, published by the Latin Game Co., Appleton, Wis.

MATHEMATICS

The plan of alternating geometry and algebra by semesters seeming too radical, it is suggested that, for the present, there be algebra during the ninth grade, geometry during the tenth, algebra during the first semester of the eleventh grade, and geometry finally during the second semester of the eleventh grade. A more detailed statement will be found below.

In the ninth grade, or even before, there should be informal exercises, in part at the blackboard, in geometrical drawing, such exercises as will be found, for example, in the following texts:

Author	Title	Publisher
Spencer	Inventional Geometry	Appleton
Failor	Inventional Geometry	Scribner
Campbell	Observational Geometry	Am. Book Co.
Minchin	Geometry for Beginners ..	Clarendon Press
Iles	My Class in Geometry	Appleton Hamilton and

Kettle A First Book in Geometry...Edwin Arnold

By means of these exercises the pupil would acquire a knowledge of a number of the more important geometrical theorems and constructions. The time for this work could profitably be taken from the excessive time now given to arithmetic and with advantage to the arithmetic. The ideas could be driven home by exercises upon them in both arithmetic and algebra. Many conceptions in these latter subjects which are abstract and vague to the average pupil could be made concrete and vital. At the same time, the pupil could acquire some notion of the following matters:

The equality and construction of triangles from three properly chosen parts.

The path of a point moving so as to be equidistant from two fixed points, or from the sides of an angle.

What angles are equal when a line cuts two parallels.

The angle-sum for a triangle.

The measures of central and inscribed angles.

The conditions for similarity of triangles.

The way in which a right triangle is divided by a perpendicular from the vertex of the right angle upon the long side.

The Pythagorean proposition.

The areas of rectangles, parallelograms, triangles and circles.

Around these the rest of plane geometry can be logically grouped as shown in the report of the Committee of Fifteen on a Geometry Syllabus. There is thus a start for those who go on. But what is far more important, those who do not go on get a nucleus of interesting and important facts. That they have been learned by observation and experiment rather than through a severe and dry process of logic is altogether a good thing. For thus did the race first learn geometry and then from geometry, arithmetic and algebra and logic and all the abstract

brood. Indeed, only in the past fifty years and by the combined labors of the greater mathematicians, has some approach to a rigid logic been made. But we have long had geometry; for "geometry is the science of the eye."

It is certainly uphill work to teach close reasoning about matters concerning which the pupil has had no chance to acquire clear and definite conceptions. Much can be done by an observational exercise of even once a week. Matters apparently forgotten leave vestiges that render the second learning more easy and direct.

The work of the various semesters will be as follows:

Grade IX, Semester 1. Algebra. Exercises in passing from ordinary to algebraic language and back again, with zealous regard to precision of statement in both languages. Especially should loose use of the equality symbol be guarded against. Technical terms should be used only sparingly; never unless the ideas that go with them have been made plain. Equations of the first degree in one unknown, with accompanying problems, can hardly be too early introduced. The idea of negative quantity can wait. Exercises with the balance clear up the usual difficulties with the equation. Some of the problems can well involve simple geometric conceptions, e. g., the angle-sum of a triangle. Other matters that can be brought into this semester are the four rules for integral expression. Note that division, when tested by multiplication, furnishes a drill in all the operations. Factorization is a sort of systematized guessing, including the factoring of not too difficult quadratics. The factoring should be tested by multiplication.

Grade IX, Semester 2. The four rules for fractions. The properties of fractions and their equalities usually given under the name of ratio and proportion. Illustrations from similar triangles and from drawing to scale. Plotting of simple equations of the first degree in two unknowns and the graphic solutions of a pair, afterward tested by the usual algebraic method. Involutions and Pascal's triangle of numbers:

$$\begin{array}{ccccccccccc}
 & & & & 1 & & & & & & \\
 & & & & 1 & & 1 & & & & \\
 & & & 1 & & 2 & & 1 & & & \\
 & & 1 & & 3 & & 3 & & 1 & & \\
 & 1 & & 4 & & 6 & & 4 & & 1 & \\
 1 & & 5 & & 10 & & 10 & & 5 & & 1
 \end{array}$$

If time permits, the square-root process with the application to arithmetic can be added.

Grade X, Semester 1. Geometry. Positions concerning straight lines, angles, triangles, quadrilaterals, circles, chords, tangents, inscribed angles. There should be constant insistence upon clear conceptions and accurate statements. It is possible, in this first semester and covering very little of the text, to initiate a class into the spirit of geometrical thinking, to get them so that they insist on seeing things for themselves, or recall seeing them. To this end the class should be put upon exercises from the very start. Mere book-work can always be profitably sacrificed thereto. Let the student have a syllabus before

him, as something to work with, not something to memorize. But insist on time, patience, determination. It is good for a pupil to hang on to a problem for a week, a month, a year, or even longer. But elusive conceptions such as incommensurables and limits should not, at this stage, be dwelt upon. They are refinements that the high-school pupil can hardly grasp. All through this semester, make haste slowly.

Grade X, Semester 2. The theory of proportion and similarity with review of the algebraic treatment. Areas of polygons and transformation of polygons into equivalent triangles and squares. The circle as a regular polygon, its circumference and area.

About 200 exercises and constructions should be performed, among which should be a number of calculations of heights and distances of inaccessible objects by means of triangles measured by the pupils. First the geometric conceptions should be formed, then the necessary calculations should be symbolized algebraically, finally the computation should be carried out. Measurement of careful drawings to scale will serve as a verification. Even the formula for the area of a circle can be tested. It is a matter of counting the squares enclosed by a circle drawn on cross-section paper.

Grade XI, Semester 1. Algebra. The meaning of exponents, positive, negative, integral, and fractional. There should be plenty of numerical illustrations, the simpler the better, both of these meanings and of the laws governing operations upon quantities affected by exponents. The transition from exponents to logarithms, with numerical exercises in which all the quantities involved are rational. Plotting of the logarithmic curve on a fairly large scale. A very large one hung on the wall of the schoolroom could be helpful. The use of four-place table. Practice once a week in logarithmic computation. The theory of radicals. Solution of the quadratic by factoring. Problems involving quadratics. Plotting of easy quadratic equations in two unknowns. Solution of the system, a quadratic and a linear equation. Solution of simple pairs of quadratics. When the equations are not too complicated they should be plotted. Some of the problems should deal with the preceding year's geometry.

Grade XI, Semester 2. Solid geometry. Many students have difficulty in understanding outline drawings of space figures; especially is this true in the drawings in the first book of solid geometry. The best help here is actual outline drawing by the students of drawings they themselves have made. Let this be accompanied by observation of the simple forms of the surrounding world, its surfaces and directions, its angles, plane, solid and dihedral, its distances, shadows and perspectives. By this means the pupils will get one important element in the understanding of all pictures. It might be easily proved to them that every picture is properly viewed from but one distance. The theorems in mensuration can be easily used to keep

up the student's algebra. For example, let the student trace the connection between the theorem on the volume of the frustrum of a pyramid in terms of the volumes of three pyramids, and the algebraic identity giving the quotient of the difference of the cubes of two quantities by the difference of the quantities. Again, let him get a formula giving the volume of a sphere in terms of the surface only. The geometry of the sphere should be studied with the help of a good globe, a spherical blackboard, and with observation by day and night of the blue sphere in which we live. On any globe a stretched string quickly and accurately gives a great circle.

NORMAL TRAINING

For the professional part of normal training as outlined in the bulletin issued by the State Department of Education, one entrance credit will be given. Two credits will be granted for two semesters of reviews in the eleventh and twelfth grades if carried in accordance with the directions given in the bulletin mentioned above, providing the student is carrying but three other subjects while doing this work. Under the latter conditions but one credit is given for the year of reviews.

PHYSICAL GEOGRAPHY

The work in physical geography should be four-fold, involving the use of a good text, reference reading, laboratory work, and field studies. A course based upon text-book work alone is entirely inadequate. The text should serve as a guide in systematically directing the course. It cannot supplant the other lines of study.

Many good textbooks have been published in recent years. With any of them excellent work is possible, so it is not thought necessary to submit a list of acceptable texts.

Laboratory work is essential. As far as possible the laboratory exercises should correlate with the text and reference readings. During the past three years the department of Geography in the University has been submitting simple suggestive exercises to many of the high schools of the state. These have been carefully tried out and criticised. As a result of this co-operative work, a Physical Geography Manual has been prepared by Professor N. A. Bengtson as a loose-leaf note-book. Fifty exercises are included. If this note-book is used, at least twenty exercises should be worked and a larger number is advisable. These exercises should be distributed topically as follows: General earth studies, 2; materials of the land—minerals, rocks and soils, 6; topography of land forms, 6; atmosphere, 6. There are several manuals published with which acceptable work can be done. In amount, however, the equivalent of that outlined above must be performed.

Teachers should, as far as possible, correlate the reading and laboratory work with the physiographic environs of the school, the principal aim being to acquaint the pupil with the processes acting in and thru the atmosphere,

hydrosphere, and lithosphere. The work of each process is to be studied in its relation to the form resulting. The life forms are best treated in relation to their geographic environments. Suggestive outlines for field work are included in the note-book manual referred to, and nearly all the manuals now in use contain valuable suggestions. Material for doing the work is not lacking. Doing the work rests with the teacher and pupils.

Trained teachers are necessary if the work is to be of the required standard. Proficiency in the related physical and biological sciences is essential, but not sufficient. Credit for physical geography should not be expected unless the instructor has had university, college or normal school training in the subject.

References

Reference literature should consist of national government and state publications, geographic magazines, and standard books in geography.

Government publications of greatest value in this subject may be obtained from the United States Geological Survey and from the Department of Agriculture, Washington, D. C. Those especially recommended from the U. S. Geological Survey are:

(1) Professional Papers 32 and 60. (2) Bulletins 274, 302 and 394. (3) Water Supply Papers, 67, 80, 184, 215, 216, 230, 255. (4) Physiographic Atlases 1 and 2. (5) Topographic maps. Selected.

The Atlases cost 25 cents each, the topographic maps 5 cents each or \$3.00 a hundred. The other publications are free.

From the Department of Agriculture should be obtained Climatic Charts, Soil Survey Reports, Farmers' Bulletins, and Year Books. Lists of available publications are sent upon request. The state publications recommended are those of the Conservation Survey, State Board of Agriculture, and the State Geological Survey. Requests for these should be addressed to the directors at Lincoln, Nebraska.

The magazines especially recommended are:

Journal of Geography, Madison, Wis., \$1.00.

National Geographic Magazine, Washington, D. C., \$2.50.

Members of the National Geographic Society can secure the last named magazine for \$2.00. The professor of geography in the University is willing to recommend most high-school teachers for membership, should they so desire.

Reference books are so numerous that any list here presented would not be complete. Among the best the following are suggested:

Eengtson. Physical Geography Manual. W. M. Welch & Co., Chicago.

Salisbury. Physiography. Holt.

Physiography of the United States. Monographs by several authors. Am. Book Co.

Gregory, Keller and Bishop. Physical and Commercial Geography. Ginn.

Russell. North America. Appleton.

Mill. International Geography. Appleton.
Ries. Economic Geology of the United States. Macmillan.
Bowman. Forest Physiography. Wiley & Sons.
Pirsson. Rocks and Rock Minerals. Wiley & Sons.

PHYSICS

Schools with proper equipment for class-room demonstrations and laboratory work are able to complete the course in one year. The time should be divided about equally between class-room and laboratory. Three periods of class work and two double periods of laboratory work each week throughout the year should suffice. When less than this amount of time is available it should be devoted to the completion of some part of the subject matter thoroly, rather than the whole of the subject in a manner necessarily superficial. It should be borne in mind that the expenditure of time and effort required by a teacher to prepare for class and experimental demonstrations, and to conduct the class exercise with laboratory work, is necessarily greater than that required for a simple recitation or lecture. Hence in the school program a differentiation should be made between the teacher with demonstrations and laboratory equipment to prepare, and the one who simply has his subject matter to master. Especially is this true in schools where inadequate or defective equipment leads to a heavy demand upon the time of the teacher in providing apparatus. Fewer class periods should be assigned the science teacher.

The laboratory part of the course should comprise at least thirty experiments of a quantitative nature. Many excellent laboratory manuals are published whence to choose such experiments. As far as possible the custom of having a group of pupils perform a single experiment should be dispensed with. Let each student be thrown upon his own resources and be forced to rely upon his own judgment and observations in performing an experiment.

Aside from the qualitative experiments performed by the teacher during the class period to illustrate and enforce the teaching, many simple experiments of a qualitative character should be performed by the pupils themselves preparatory to the discussion of the topics of the next succeeding class period. There is secured in this way a very definite understanding of the meaning of terms to be employed by teacher and textbook, a first-hand knowledge of the phenomena to be discussed, and an appreciative attitude toward such instruction. The quantitative experiments follow class discussions, constituting an application of the instructions given. Experiments which possess an intrinsic practical significance are preferable. Simple experiments which lack the elements of precision of manipulation, such as the inclined plane, siphon, etc., should not displace experiments of greater value as laboratory exercises in the development of manipulative skill and habits of precision.

The metric system should be used in all measurements, and decimal fractions in all calculations. The pupils should learn to think of and estimate quantities in metric units and in tenths of units.

The class-room should be well lighted, preferably with south exposure. It should be provided with a large lecture table containing drawers and compartments for supplies and for the storage of smaller accessories to class demonstrations. It should be supplied with water and a sink, and with gas and electric connections if these are available. There should be curtains for darkening the room as well as a device for reflecting sunlight to the lecture table. The lecture table should be lower than the level of the pupils' eyes when seated in class-room, instead of being elevated upon a rostrum as is too commonly the case.

Portraits of noted scientists are recommended for the walls of the class-room, such decorations being more inspiring and instructive than bare walls. In the laboratory, color charts, tables of comparison of units, graphical plots of the results of some well-performed experiments, and diagrams of the more complicated apparatus will be found helpful.

The laboratory should be roomy and well ventilated, and should adjoin the class-room. Free wall space is very essential for the suspension of apparatus. A number of heavy tables of suitable size and height for the different types of experiments should be provided. Bracket shelves on walls are very satisfactory for many experiments, if the building is free from serious jarring. A water supply and sink are essential in the laboratory. When a water system is not available, a two or three-barrel tank, located near the class-room, should be connected with the lecture table. There should be a case for supplies and apparatus. A small work bench and tools should be provided for construction work and repair of apparatus.

Where classes are not large, and where other conditions permit, a double period every day in physics would give time for lesson preparation under supervision as well as for the laboratory work and class work. The physics teacher would thus have fullest freedom in use of this time for experiments or other laboratory exercises, for class work, or for lesson preparation according as the nature of the work in hand might make desirable. Difficulties in the make-up of the general school program due to the double period for laboratory work on certain days only would thus disappear. The same room could be used for both laboratory, class and study purposes very satisfactorily.

A large, well-filled case of reference books should be conveniently near for the pupils' use. One or two of the general scientific periodicals are recommended for the reading table. Among the large number of texts and reference works the following, while not all of equal worth, are representative:

Texts

- Carhart and Chute. First Principles of Physics. Allyn & Bacon. \$1.25.
 Hoadley. Brief Course in Physics. Am. Book Co. \$1.20.
 Mann and Twiss. Physics. Scott, Foresman & Co.
 Millikan and Gale. First Course in Physics. Ginn. \$1.25.

Laboratory Manuals

- Chute. Physical Laboratory Manual. Heath. 80 cents.
 Coleman. Physical Laboratory Manual. Am. Book Co. 60 cents.
 Cheston-Dean-Timmerman. Laboratory Manual of Physics. Am. Book Co. 50 cents.
 Nichols-Smith-Turton. Manual of Experimental Physics. Ginn. 80 cents.
 Brownell. Lessons in Physics. Nebraska School Supply Co. 50 cents.
 Adams. Physics Laboratory Manual. Am. Book Co. 75 cents.

General Reference

- Carhart. College Physics. Allyn & Bacon. \$2.25.
 Daniell. A Text-book of Principles of Physics. Macmillan. \$4.
 Ganot (Atkinson's Translation). Physics. W. A. Wood & Co. \$5.
 Tait. Properties of Matter. Macmillan. \$2.25.
 Tyndall. Sound. Appleton. \$2.
 Watson. Physics. Longmans. \$2.90.

Apparatus

In many experiments simple apparatus is quite as efficient as more elaborate and expensive instruments. If funds are limited sufficient apparatus of the simple kind should be secured rather than a few expensive pieces. Yet one should not sacrifice effectiveness to cheapness. Apparatus should be capable of giving reasonably reliable quantitative results.

Among the things requisite are glass tubing, files, a soldering iron, clamp and ring stands, test tubes, flasks, wire, rubber stoppers, metric rules, rubber tubing, calipers, micrometer screw, a balance (not a platform balance), a clock with a seconds pendulum, thermometers, etc. The equipment required is of two sorts: (1) apparatus for class-room demonstrations, by means of which experiments of qualitative nature can be performed by the teacher in connection with the class work; (2) apparatus for individual laboratory practice by pupils themselves, which gives training in manipulation, develops habits of precision and accuracy, and secures intelligent observation of the phenomena of nature. Schools of limited means will do well to omit the purchase of the more expensive demonstration apparatus for example, Atwood's Machine, Holtz machines, large air pumps, X-ray and wireless telegraphy outfits, etc., until a fairly thorough equipment of the more essential apparatus has been obtained. A wise expenditure of a hundred dollars for many relatively inexpensive pieces

of apparatus having a wide range of use, goes far towards providing a satisfactory working outfit to begin with.

High schools are entitled to duty-free entry of apparatus and supplies purchased abroad, and the economy of buying a large bill of such supplies of foreign make is frequently quite considerable. Especially is this true of thermometers, glassware, balances, and weights. Among the numerous supply houses dealing in material for the physical laboratory may be mentioned:

The Scientific Shop (Importing Jobber), Chicago.

Bausch & Lomb Optical Co. (Optical and General), Rochester, N. Y.

Eimer & Amend (Chemical and General), New York.

C. H. Stoelting Co., Chicago.

L. E. Knott Apparatus Co., Boston.

H. Heil Chemical Co. (General), St. Louis, Mo.

Central Scientific Co. (General), Chicago.

PHYSIOLOGY

In order that a high-school course in physiology may be acceptable it must form a distinct advance on any work done in the lower grades. A mere review or repetition of the work ordinarily given in the grades will not entitle the student to entrance credit. The course should embrace facts and principles derived, not from physiology alone, but also from related and allied subjects—anatomy, zoology, botany, chemistry, physics, psychology, hygiene, etc., which taken together, will serve to inculcate proper habits of mind and body and to train pupils in an appreciation of the value of right living and thinking. The preeminent value in the study of physiology lies in its relation to hygiene. Too much stress can not be laid upon the value of daily exercise (both mental and physical), bathing, proper diet, sleep, ventilation, etc., and upon public hygiene and sanitation. In addition to this intrinsic worth, the subject possesses a cultural value equal to that of any other natural science. If properly taught it cultivates the powers of observation; as a result of laboratory work, it gives skill in manipulation; thru the drawing of conclusions from experimental work and thru the practical application of things learned, it increases the ability to reason. Following the recommendation of the National Education Association, the course should be placed in the eleventh or twelfth grade. The study at that time of the human body as a living thing can not fail to be of the greatest advantage to the pupil in later life.

In order to indicate more clearly the ground to be covered, teachers are advised to use as the basis of the course some standard text book, such as the *Human Mechanism* of Hough and Sedgwick. Particular stress should be laid upon demonstrations and laboratory work. The former should be accessible to each student for sketching and study, since mere demonstrations shown by an instructor to the class, without requiring individual examination and note-taking, are of little value.

Since an intelligent appreciation of function is greatly aided by an elementary knowledge of structure, it is very desirable that at least one compound microscope be used to demonstrate the finer structure of the principal tissues of the body and the organisms producing disease. Typical mounted slides for this purpose can be procured at cost price by addressing the physiological department of the University.

The laboratory work should include experiments of a more strictly physiological character, the extent of which will be determined by the equipment available, altho no school need be prevented from attempting such on account of the cost of the apparatus. Many of the bodily functions can be illustrated by experiments carried out by the students on themselves and by means of home-made apparatus. Recent text-books in physiology are full of directions and suggestions in this respect. Vivisection in high schools is undesirable and a consideration of the morbid changes and pathological lesions is unnecessary, except in so far as required by the laws of the state.

Many text-books contain suggestions for teachers, which should all be considered. Textbooks differ so widely in the ground covered and in the emphasis laid upon special portions of the subject that the teacher is obliged to form an acquaintance with a large number of texts and to make a judicious selection of what is good in them, to add, by verbal instruction or otherwise, to that which is taught in the text used. The same holds true for laboratory manuals. The value of the relative proportions of recitation periods to laboratory periods must vary considerably with the experience of the teacher, with the equipment of the school, etc., and must be left to the judgment of the teacher. On account of the effects on the presentation of physiology as a science brought about by the state laws regarding the action of alcohol and narcotics upon the body, it seems desirable to make temperance instruction a subject in itself, and to place the facts of physiology proper in a consideration of life processes in general, i. e. in a course in biology. An exposition of this idea, together with much valuable and excellent information, is to be found in **The Teaching of Biology in the Secondary School** by Lloyd and Bigelow (Longmans, Green & Co.), a volume indispensable to all progressive teachers of physiology.

The prime consideration in the acceptance of a high-school course in physiology for credit is that the teacher shall have had a special training in the teaching of physiology in a college, normal school or university where such courses for teachers are offered.

Texts

Hough & Sedgwick. *The Human Mechanism—Physiology, Hygiene and Sanitation*, 1906. Ginn.

Colton. *Physiology—Experimental and Descriptive*, 1898. Heath.

Hutchinson. *Physiology and Hygiene*, 1905. Merrill.

Martin. *Human Body, Briefer Course*. Holt.

- Brown. Physiology for the Laboratory, 1900. Ginn.
Peabody. Laboratory Exercises in Anatomy and Physiology, 1902. Holt.
Murbach. Directions for Elementary Laboratory Work in Physiology and Hygiene. Macauley Bros.
Eddy. Experimental Physiology and Anatomy. Am. Book Co.

ZOOLOGY

In most cases only one semester's work is advised, although schools with a well-equipped laboratory can profitably spend a year on the subject. A very satisfactory plan involves the study of botany and zoology in successive semesters or alternately throughout the week during an entire year. The minimum time assigned to the subject should embrace each week for one semester three class periods, together with two laboratory periods of double length.

Where lack of funds prevents the purchase of equipment necessary for the teaching of chemistry and physics, the school may well introduce a course in zoology, as the expense for the course is inconsiderable and the same laboratory equipment can be employed for botany and physiology as well. No study surpasses zoology in cultivating power of observation, description, analysis and reasoning.

The regular laboratory work should cover the study of a limited number of carefully selected types, and should be accompanied by notes and drawings in all cases. A series of typical forms should be mastered rather than a superficial study made of a larger number of animals. Emphasis should be laid upon animal activities rather than upon the minute detail of structure. The course should begin preferably with the lower, simpler forms and proceed gradually to those more complicated. This plan should be followed when the course is in the eleventh or twelfth grade; if it is offered earlier the teacher may find it better to begin with an introductory study of a few familiar animals, such as the frog and the locust, and to follow this with a closer study of type forms in their logical order.

A collection of local animals should be made by teachers and pupils, not only because these forms are of value as demonstration material, but also because the collecting will sustain and stimulate interest. The teacher should plan to repress the spirit of indiscriminate collection or destruction of animal life. To add to local forms a collection illustrating the great groups of animal life, especially those not represented in the region, will be of real value to the school and will materially assist in giving the pupils correct ideas regarding the forms of which they read.

Some time should be given to excursion and study in the laboratory of nature. Such work must be laid out very definitely to prevent its becoming desultory and losing its educational value. It is wise to select a unit of environment and to subject it to careful study rather than to attempt to cover much territory.

The economic side of the subject should be brought to the attention of the class. The life history of insects is interesting, easily studied, and of great importance in an agricultural state. The knowledge of birds should also be carefully considered, and the relations of animals, such as flies and mosquitoes, in carrying disease should be clearly illustrated. Such problems are naturally studied in connection with field work and should be fixed in the minds of pupils by actual examples.

When directed by a teacher of thoro preparation in the subject the course in zoology will be one of the most valuable and attractive in the entire curriculum.

The department of zoology will gladly advise regarding equipment, material, and details of the course.

Texts

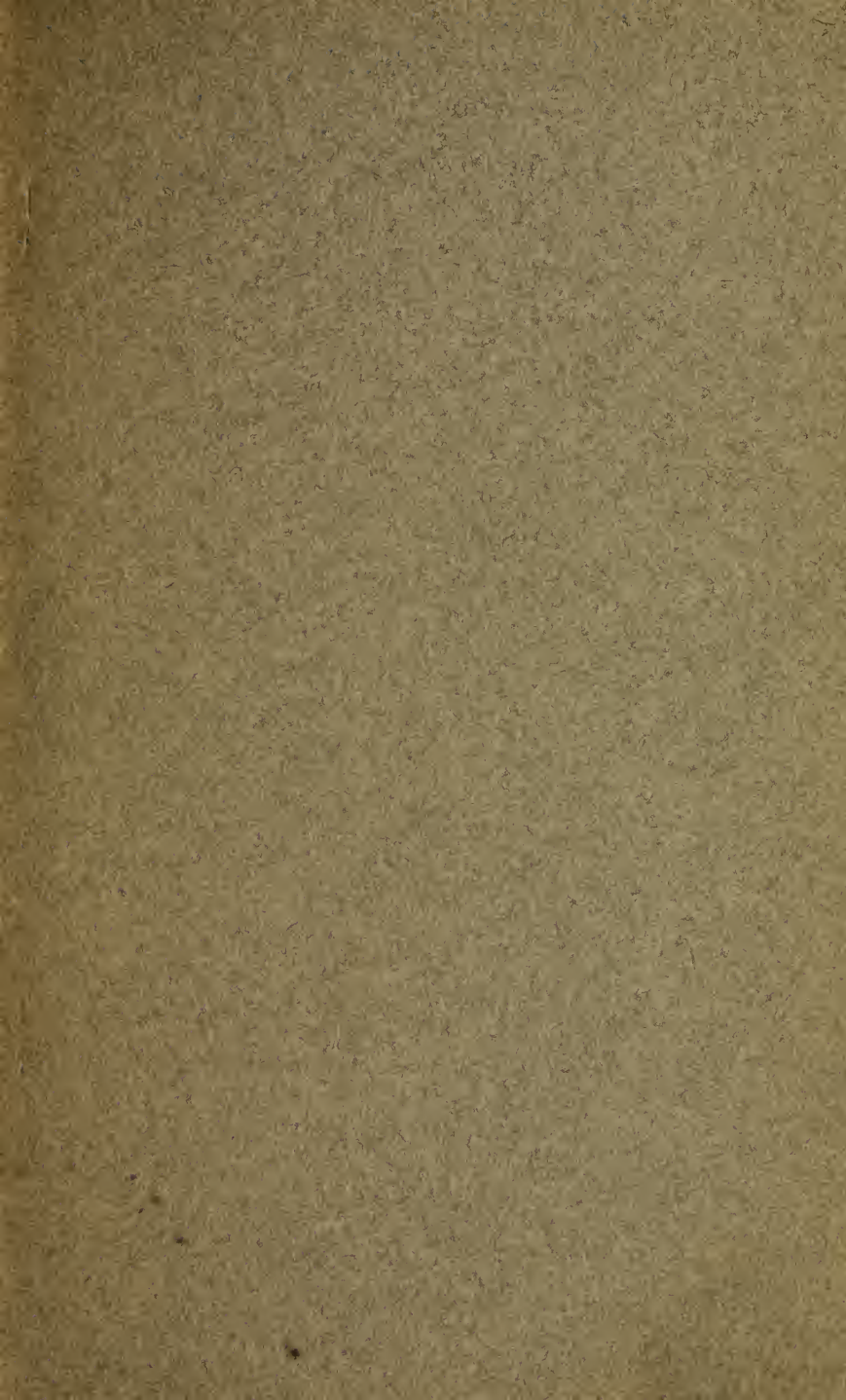
Jordan, Kellogg, and Heath. *Animal Studies*. Appleton.
 Kellogg, V. L. *Elementary Zoology*. Holt.
 Colton, B. P. *Zoology, Descriptive and practical*. Heath.
 Davenport, C. B. *Introduction to Zoology*. Macmillan.
 Jordan and Kellogg. *Animal Life*. Appleton.
 Thompson, J. A. *Study of Animal Life*. Scribner.
 Jordan and Heath. *Animal Forms*. Appleton.
 Linville and Kelly. *Textbook in General Zoology*. Ginn.

Laboratory Manuals

Boyer, E. R. *Elementary Biology*. Heath.
 Linville and Kelly. *Laboratory Manual*. Ginn.
 Needham, J. G. *Elementary Lessons in Zoology*. Am. Book Co.
 Walker, Whitney and Lucas. *Studies of Animal Life*. Heath.
 Duncanson, H. B. *Suggestive Lessons in Elementary Zoology*. Jacob North & Co.

Library Reference Works

Hertwig, R. *Manual of Zoology*. Holt.
 Thomson, J. A. *Outlines of Zoology*. Appleton.
 Parker and Haswell. *Text-book of Zoology*. Macmillan
 Shipley and Macbride. *Zoology*. Macmillan.
 Sedgwick and Wilson. *General Biology*. Holt.
 Parker, T. J. *Lessons in Elementary Biology*. Macmillan.
 Dodge, C. W. *Elementary Practical Biology*. Harper.
 Galloway, T. W. *First Course in Zoology*. Blakiston.
 Thomson, J. A. *Science of Life*. Stone.
 Stokes, A. C. *Aquatic Microscopy*. Bigelow.
 Gage, S. H. *The Microscope*. Comstock.
 Huxley, T. H. *The Crayfish*. Appleton.
 Metcalf, M. M. *Outlines of the Theory of Organic Evolution*. Macmillan.
 Conn, H. W. *Method of Evolution*. Putnam.



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